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OLEATES.

BY G. M. BERINGER, PH. G.

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Historical.—The medicinal application of the oleates was proposed by Professor John Marshall, of London (see AMER. JOUR. OF PHAR., 1872, p. 317). He claimed that the oleate of mercury containing the mercury in solution in a solvent remarkable for its diffusibility and penetrating properties, was quickly absorbed, promptly producing the effect of the mercury. Numerous metallic oleates and solutions of the alkaloids in oleic acid were soon tried by various investigators, and a series of valuable papers contributed in the various pharmaceutical and medical journals mark the progress of our knowledge in this direction. Among the more notable being the papers of Dr. L. Wolff (AMER. JOUR. OF PHAR., 1881, p. 545), Dr. J. V. Shoemaker (*Med. and Surg. Report.*, May 13, 1882), and H. B. Parsons (*Drug. Circ.*, 1885, p. 2), who furnished a series of formulas which have been made the basis of the formulas for the oleates of the National Formulary.

The oleates as originally proposed were prepared by dissolving the oxides of the various bases in oleic acid, and the oleates recognized by the United States and British Pharmacopœias are thus prepared. Unfortunately, as thus prepared they are not, as a rule, as permanent or as acceptable as those obtained by double decomposition. The oleates as now prepared by the manufacturing pharmacists are largely true oleates or oleo-palmitates or oleo-stearates of the bases prepared by double decomposition, and it is hoped by the writer that in the next revision of the Pharmacopœia formulas for such will be introduced.

The oleates which have withstood the test of therapeutical experiments and are still prescribed are the oleates of zinc, mercury, copper, lead and bismuth, and the alkaloidal solutions the so-called oleates of aconitine, cocaine, morphine, veratrine and quinine.

It is not the object of the present communication to present an entirely original line of thought, but to record a few observations on this subject and to furnish working formulas for those oleates which the pharmacist is called upon to dispense, and which will undoubtedly claim the attention of the Committee of Revision of the Pharmacopœia in 1890, and to call particular attention to a few points in manipulation which are essential to note in order to obtain good products.

First, it is to be observed that the character of the product is materially altered by the concentration of the solutions used and the temperature at which the precipitation is accomplished. The same strength of solutions will not answer for all of the oleates, nor can a uniform temperature be adopted for their precipitation.

Secondly, neutral solutions or only slightly acid solutions of the metallic salts can be used, a strongly acid solution decomposing the oleate of potassium or sodium used, with the liberation of oleic acid. On the other hand, an alkaline oleate solution will yield a product more or less contaminated with a hydrate of the base.

It was proposed by Dr. J. V. Shoemaker (*loc. cit.*) and also by H. B. Parsons (*loc. cit.*) to use a solution of Castile soap as a precipitant. The Castile soap of the market is of questionable composition, varying considerably and usually yields a solution with water which clears or subsides but slowly, and is filtered with difficulty. It seems, therefore, to me advisable to replace this with a solution of oleate of potassium or sodium prepared by saponification of oleic acid with an alkali.

The preparation of a neutral soap with an aqueous solution of alkali is difficult, the attempt resulting in a decidedly alkaline solution. If an acid oleate of the alkali is produced it will produce a cloudy solution which will not filter readily (the acid oleates of the alkalies being insoluble). For these reasons hydro-alcoholic solutions of the alkaline hydrate are used, by which means a perfectly neutral soap can be procured, which can be easily diluted with water and the solution filters easily through paper. Experiments showed that the quantity of alcohol necessary can, with proper manipulation, be reduced to comparatively a small amount.

Acidum Oleicum is stated by the U. S. Pharmacopœia to have a specific gravity 0·800 to 0·810. The U. S. Dispensatory, page 89, states that this is an error, and should be 0·900 to 0·910. Gmelin (vol. xvii, p. 64) quotes Chevreul as authority for specific gravity 0·898. The British Pharmacopœia states ·860 to ·890. While Allen (Commerc. Organic Analysis, vol. ii, p. 233) states that the pure acid "has a density of ·897 at 19° C.," and calls attention to an error in Watt, who quotes Chevreul as ·808 and says, "the same mistake is made by Wurtz and other industrious compilers and copyists." The oleic acid for pharmaceutical purposes need not be a chemically pure acid. In fact, for many oleates, notably for bismuth oleate, it is desirable to have present a small amount of stearic acid. Purified red oil answers admirably for all medicinal oleates. According to Chas. Rice (AMER. JOUR. PHAR., 1873, p. 1), such a purified acid exhibits a specific gravity of ·895 at 62° F. E. C. Saunders (*New Remedies*, June, 1880), reports ·897, while Dr. Squibb (*Ephemeris*, 1882, p. 158) states the specific gravity at ·898. Several commercial samples recently examined showed specific gravities of 0·8991, 0·8992, 0·909, at 60° F. Another sample was semi-solid at 60° F., so the specific gravity was taken at 66° F. and found to be 0·8854. Another sample received from the manufacturer without subsequent purification had a gravity of ·8846 at 60° F. The first and second were light in color and contained but small quantities of other acids. The third was very dark colored and the fourth, while of a paler color, contained a large excess of solid acids. These figures indicate that the correct specific gravity should be 0·890 to 0·900. The first acid was the one used for the experiments here recorded :

Zinci Oleas.

Oleate of zinc, $\text{Zn}(\text{C}_{18}\text{H}_{33}\text{O}_2)_2$.

Take of—

Oleic acid.....	1,000 grains.
Soda ¹	160 " or q. s.
Alcohol.....	6 fluidrachms.
Zinc sulphate.....	550 grains.
Water, a sufficient quantity.	

Warm the oleic acid in a capacious vessel on the water-bath to a temperature of 60° to 66° C. (140° to 150° F.), and having dissolved the soda in a mixture of the alcohol and two fluidounces of

¹The granular soda, known as Banner lye, containing about 90 per cent. of soda, was found to answer well for this purpose.

water, slowly add the soda solution, stirring constantly until the acid is entirely neutralized, and a small portion of the resulting soap dissolved in alcohol yields but a faint pink tint on the addition of a few drops of alcoholic solution of phenol phthaleine. Dissolve the resulting soap in three (3) pints of warm water and filter if necessary. Dissolve the zinc sulphate in one (1) pint of water and filter. Warm the solutions to 43° C. (110° F.), and slowly add the zinc sulphate solution to the soap solution, stirring constantly. Collect the precipitate on a moist filter, wash thoroughly with distilled water and finally dry on bibulous paper at a temperature not exceeding 38° C. (100° F.).

In the above formula, there is ordered an excess of zinc sulphate as this tends to more readily separate the oleate produced. It is important that the temperature of the solutions on precipitating should be maintained at 100°–110° F. At this temperature the oleate on drying is obtained in white friable masses to powder which it is only necessary to rub through a sieve. If a temperature much lower than this is used the resulting oleate is in curdy masses which are glutinous to the touch and almost impossible to pulverize. If precipitated at a higher temperature the result is a fused mass of oleate of a greasy nature, which can only be dried and pulverized with difficulty and the resulting powder is gritty. As thus obtained, oleate of zinc is a nearly white, impalpable, unctuous, slippery powder, fusing at 75° C., very soluble in ether, carbon bisulphide, chloroform, and benzol, somewhat less soluble in turpentine, petroleum ether and alcohol.

The yield was 1,122 grains, theoretical yield being 1,115 grains. The excess most likely being due to water retained at 100° F.

Plumbi Oleas.

Oleate of Lead, $\text{Pb}(\text{C}_{18}\text{H}_{33}\text{O}_2)_2$.

Take of—

Oleic acid.....	1,000 grains.
Soda	160 " or q. s.
Alcohol.....	6 fluidrachms.
Lead acetate.....	675 grains.
Water, a sufficient quantity.	

Saponify the oleic acid as directed in the formula for zinc oleate, and dissolve the resulting soap in three (3) pints of warm water and filter. Dissolve the lead acetate in two pints of water, adding a few drops of acetic acid if necessary to produce a clear solution, and filter. Warm the solutions and add the lead acetate solution slowly to the soap solution, stirring constantly. Collect the mass on a strainer, wash and dry.

Oleate of lead thus prepared is a buff-colored firm mass, fusing at 65° C., forming an entirely clear liquid at 68° C., and is very soluble in carbon bisulphide, chloroform, ether, petroleum ether and benzol, sparingly in turpentine and alcohol. There is but little use for this oleate, as the officinal lead plaster and diachylon ointment are practically preparations of lead oleate and sufficient for its exhibition.

Cupri Oleas.

Oleate of Copper, $\text{Cu}(\text{C}_{18}\text{H}_{33}\text{O}_2)_2$.

Take of—

Oleic acid.....	1,000 grains.
Soda.....	160 " or q. s.
Alcohol.....	6 fluidrachms.
Copper sulphate.....	442 grains.
Water, a sufficient quantity.	

Saponify the oleic acid as directed in the formula for zinc oleate, and dissolve the resulting soap in three (3) pints of water. Dissolve the copper sulphate in one pint of warm water and filter. Warm the solutions to about 140° to 150° F., and slowly add the copper solution to the oleate of soda solution, stirring constantly; warm until the copper oleate fuses into a mass, decant the clear supernatant liquid, wash several times with warm water, and finally dry on the water-bath.

Yield, about 1,100 grains, theoretical yield 1,108.

Oleate of copper, as thus produced, is a bright green waxy mass, fusing at 49° C.; very soluble in carbon bisulphide, chloroform, benzol, ether, turpentine, petroleum ether, absolute alcohol, alcohol and fixed oils.

Hydrargyri Oleas.

Oleate of Mercury, $\text{Hg}(\text{C}_{18}\text{H}_{33}\text{O}_2)_2$.

The oleate of mercury is perhaps the oleate most frequently prescribed, and which, made in accordance with the Pharmacopœia by dissolving the oxide in oleic acid, is a very unstable compound. The very excess of oleic acid being the prime factor in causing its decomposition. Several writers have proposed to make the officinal oleate a twenty per cent. solution of the oxide in oleic acid. This, while a more stable preparation than the present officinal ten per cent. solution, is more susceptible of change than a true oleate made by double decomposition. It seems to me to be far better to make the officinal a true oleate in composition as well as in name. Dr. J. V. Shoemaker (*loc. cit.*) proposed to make such an oleate of mercury by decomposing oleate of soda solution by means of mercuric chloride, the solutions

being mixed and boiled until the resulting oleate furnished a mass. The long boiling always resulted in a partial decomposition of the oleate, more or less of the mercury being reduced. H. B. Parsons (*loc. cit.*) proposed the decomposition of potassium oleate by means of a solution of mercuric nitrate. Mr. Louis Dohme (*AMER. JOUR. PHAR.*, 1873, p. 158) proposed a similar formula. With proper care this method will yield good results. The following is the formula I have used:

Take of—

Oleic acid	1.000 grains.	
Potassa.....	220	" or q. s.
Red oxide of mercury.....	383	"
Nitric acid.....	323	" or q. s.
Alcohol.....	6	fluidrachms.
Water, a sufficient quantity.		

Saponify the oleic acid with the potassa as directed in the formula for zinc oleate, and dissolve the resulting soap in two pints of warm water and filter. Mix the nitric acid with the two fluidounces of water, heat to boiling and add the mercuric oxide previously reduced to powder. Boil until it is entirely dissolved, adding, if necessary, a few drops of nitric acid additional. Dilute the solution of mercuric nitrate with four fluidounces of water. Warm both solutions to 66°C. (150°F.) and add the oleate of potassium solution to the mercury solution, stirring constantly. Decant the aqueous solution and wash the precipitate with warm water not exceeding 150°F. If precipitated at a much lower temperature it will be necessary to heat the mixture to near boiling in order to form a mass of the precipitate, which heating is almost certain to result in a partial decomposition of the oleate. The same is apt to result if the solutions are mixed at a higher temperature. In connection with this we recall the experiments of Chas. Rice, who proved that as the temperature was advanced in preparing oleate of mercury the quantity of oxide reduced greatly increased. (*AMER. JOUR. PHAR.*, 1873, p. 1).

The yield by the above formula was 1,329 grains, theoretical yield being 1,350 grains. Oleate of mercury as thus prepared is about the color of a very pale citrine ointment and of somewhat softer consistency, fuses at 66° C. (150° F.), yielding an entirely clear fluid at 70°C. It is very soluble in carbon bisulphide, chloroform, ether and turpentine, and yields an opalescent solution in benzol and petroleum ether, and is slightly soluble in absolute alcohol and alcohol.

The aqueous solution decanted from the precipitate gave no indications of mercury with solution of potassa or potassic iodide, proving the complete precipitation of the metallic salt.

The sample shown, marked No. 1, was prepared over four months ago, and has been purposely kept in a warm part of the store in a flint vial, the stopper being occasionally removed. The surface exposed to the light now shows a reduction of the mercury, which was not very marked until three months of summer weather had elapsed since the preparation. The second sample was prepared about a week ago.

Bismuthi Oleas.

Oleate of Bismuth, $\text{Bi}(\text{C}_{18}\text{H}_{33}\text{O}_2)_3$.

The most difficult oleate to prepare by double decomposition is the bismuth oleate. The tendency of bismuth solutions to precipitate oxy salts unless in decidedly acid solutions, and the decomposition of the oleate solution used by the acid solution renders it almost impossible to thus make this oleate. Mr. H. B. Parsons (*loc. cit.*) attempted to overcome this difficulty by using a solution of crystallized nitrate of bismuth in glycerin. Even this is apt to yield unsatisfactory results. I have obtained more satisfactory results by saponifying the acid with oxide of bismuth. On heating oxide of bismuth with oleic acid but a very small portion is dissolved; on boiling them together with water, however, saponification takes place. Owing to the variability of commercial subnitrate of bismuth (see AMER. JOUR. PHAR., 1888, p. 385) good results were not obtained by taking a definite weight of that salt and precipitating the hydrated oxide from its solution in nitric acid. The quantity of hydrate varied so much as to yield on boiling with the calculated quantity of oleic acid an oleate of too soft a consistence. For these reasons I prefer to use an oxide dried at 212°F .

The following is the formula I prefer.

Take of—

Bismuth oxide dried at 100°C . (212°F .) until it ceases to lose

water.....1 troy oz.

Oleic acid.....3 troy oz. and 295 gr.

Water, a sufficient quantity.

Rub the oxide of bismuth to a fine powder, and thoroughly mix it with the oleic acid in a capacious vessel, add two pints of water and boil the mixture, replacing the water as it evaporates, and stirring frequently until complete saponification has taken place and a small quantity of the mass dropped into cold water yields an ointment-like

mass without any separation of oleic acid. Decant the water from the oleate and work the mass with a horn or wooden spatula to free it from retained water.

Bismuth oleate thus prepared is a cream colored mass about the consistence of an ointment, softening at the temperature of the body and fusing at 58° C. It is easily decomposed by contact with metals, and is but very slightly soluble in the usual solvents for oleates.

COMMERCIAL TAR.

By R. G. DUNWODY.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy.—No. 62.

Tar, as found and used in the United States, is the product of the incomplete combustion of the fat pine or *Pinus palustris* and some other pine species. North Carolina produces most of the tar exported from this country, although small quantities, especially for home consumption, are manufactured in South Carolina, Georgia, and several other of the Southern States. There are at least three methods by which tar is made, perhaps the simplest being that in which the wood is cut into short lengths, split, and the pieces wedged vertically into an iron pot so as to project some distance above the vessel. The whole is then inverted over another iron pot and the wood ignited, the flame rises around the outside of the pot, melting the resin in the wood which is partly burned on reaching the flame and drops down into the vessel below. This process is employed by pharmacists and others who wish to produce a small quantity of tar for their own use.

A second method adopted for the same reasons consists in cutting the wood into lengths of two to three feet, splitting to a diameter of about two inches and placing a number of these at the top of an inclined plane of sheet iron; on igniting the wood the tar runs down the plane and is collected below. The third method is used in preparing larger quantities and consists in cutting the wood into lengths of two to three feet, splitting it into billets and arranging the end in a pile six to eight feet diameter, covering with bark and then with clay. A fire is then kindled on top, the fuel being some of the poor pieces of pine and when the whole becomes heated, the tar runs off below through an iron pipe previously inserted for the purpose. The first two pro-

cesses are very wasteful and the product is much darker than that prepared by the last method, which yields a lighter colored product of a very characteristic tar odor.

Living in the State of Georgia and in a locality to see something of the manufacture of tar by the above mentioned processes, I procured a sample made by the third method, which nearly represents the commercial article. I was also supplied by Mr. Fletcher with a sample made by the first process, from his locality, near Little Rock, Arkansas. A third sample—"North Carolina pure pine tar, refined and especially adapted for medicinal or any other purposes," put up and sold by Mr. Good, of Philadelphia—was procured from the College Cabinet, and examined with the other two. It is labelled as coming from North Carolina. An account of the method used in refining it may be found in the AMER. JOUR. PHAR., 1889, page 234, by Dr. C. B. Lowe.

The three samples were first spread in thin layers on glass. On holding towards the light the refined tar was found to be smooth and amorphous, while the other two samples were shown to be largely composed of granular transparent masses, which under the microscope assumed a crystalline form, showing brilliant effects with polarized light. These crystals, according to Flückiger (*Pharmacographia*, 2d ed., page 622), are pyrocatechin. The specific gravity of the refined tar was found to be 1.040, that from Georgia 1.083, and the sample from Arkansas 1.090. The average specific gravity of tar from coniferæ is said to be 1.060. None of the samples were completely soluble in petroleum ether (b. p. 25°-40° C.). All were soluble in 95 per cent. alcohol, absolute alcohol, ether, and chloroform. All were acid to litmus paper and imparted an acid reaction to water. Ten grams of each sample were digested with water for forty-eight hours, the clear aqueous solutions, which had become yellow in color, was separated, agitated with ether, and the ether allowed to evaporate spontaneously, when a brown somewhat oily residue was obtained in every case. The residue was nearly completely soluble in water, and the aqueous solutions when treated with ferric chloride gave greenish colors, with ferric acetate darker colors, with ferrous sulphate no change, with calcium hydrate red-brown colors, and with gelatin no change. These tests all indicate the presence of pyrocatechin, and judging by the colors it was most abundant in the Arkansas and Georgia tar, and almost absent in the refined tar. The remaining

aqueous solutions left after making the above tests were allowed to evaporate spontaneously over sulphuric acid and deposited a somewhat crystalline residue, most marked in the Georgia sample and least in the refined sample. No sediment was found in any of the samples, and they dissolved completely without leaving sand, chips, or clay behind.

It is suggested that this refined tar had lost much of the pyrocatechin through contact with water.

It appears from the above results that the best method of examining a sample of tar would be to take its specific gravity, try its solubility with the above solvents, and examine the ethereal solution of the aqueous extract for pyrocatechin. Comparing a thin layer on glass with a sample of known purity, a microscopic examination would also be of value in determining the quality of a sample.

CONTRIBUTION TO THE KNOWLEDGE OF BORON.

BY HENRY C. C. MAISCH, PH.G., PH.D.

During his researches on the electrolysis of the alkaline oxides and hydroxides, Sir H. Davy also subjected boric acid to the action of the electric current (*Phil. Trans. Royal Society*, 1808, p. 43). He obtained a black combustible substance, which, however, he did not further describe. Without doubt he was the first to obtain boron in the free state, though to two French chemists, Gay Lussac and Thénard (*Gilb. Ann. der Phys.*, 1808, p. 30), belongs the credit of first describing the element, which they obtained by the action of potassium on melted boric acid. During the year 1888, W. Hampe (*Chem. Zeit.*, xii, 841) prepared boron by the electrolysis of borax, which he melted in a graphite crucible.

Wöhler and Deville (*Ann. Chim. Phys.*, 1858 (3), lii, p. 84) during their classic researches on boron and its compounds employed the process of Gay-Lussac and Thénard, using potassium or sodium, but they also found that by using aluminium crystalline boron was obtained.

We are indebted to Berzelius for two further methods: (1) by the action of potassium on boron fluoride, and (2) by the action of potassium borofluoride at the fusing point of the former. Wöhler and Deville (l. c.) and Geuther (*Jenaische Zeitschr. für Med. und Naturw.*,

ii, p. 209) found that in place of potassium or sodium, magnesium could be used to advantage in the last method.

On the advice of Prof. L. Gattermann, I took up the reduction by means of magnesium, using in place of potassium borofluoride the cheaper borax. This was employed in the form of powdered borax glass because the water of crystallization otherwise present would have an injurious effect on the reaction.

Without going into details as to the experiments made with the idea of finding the best proportion of the reagents to be used, I will simply give the one which was found to be the best. The bottom of a hessian crucible was covered with the powdered borax glass, on this an intimate mixture of two parts borax and one part magnesium powder was packed, so as to drive out as much air as possible, and this was covered by about half an inch of powdered borax glass, which is to fill the crucible. The lid is then fastened down with moist clay and the whole subjected to the heat of a well-drawing charcoal furnace, the crucible being surrounded by the fuel, which is allowed to burn down once. After cooling, the crucible is broken and the product finely pulverized. The powder is extracted with boiling water, and, after cooling, thrown in small portions into cooled diluted hydrochloric acid and allowed to remain for four or five hours, after which it is filtered off and subjected to the action of concentrated hydrochloric acid for about two hours. The powder is then filtered off, washed with water and dried either by the heat of a water bath or by the following method: The water is replaced with alcohol, this in turn by ether, and this allowed to evaporate at the temperature of the room. The boron thus obtained is by no means pure, but answers perfectly well for the preparation of its halogen derivatives.

Boron trichloride.—The first method to be found in literature is that of Berzelius (*Pogg. Ann.*, 1824, ii, p. 147) who states that amorphous boron which has been dried in a vacuum ignites in an atmosphere of chlorine at ordinary temperatures, while boron which has been heated reacts only at higher temperatures. Some decades later Wöhler and Deville (*l. c.*) showed that the same takes place in hydrochloric acid gas; the reaction, however, must be completed at higher temperatures. They also found that by the action of boron on mercuric chloride, lead chloride, or silver chloride this compound was likewise obtained.

The method which has been used up to the present for the preparation of the chloride is that of Dumas (*Ann. Chim. Phys.*, 1826, xxxi,

p. 466 ; xxxiii, 376), who allowed chlorine to pass in a tube over a heated mixture of powdered melted boric acid and charcoal.

It seemed to be of interest to ascertain how the boron prepared by the above method would behave towards chlorine. The apparatus which was used was the following : A hard glass tube, as used for combustions, about 4 to 8 inches longer than the combustion furnace to be used, is drawn out at one end and bent almost at right angles. This part is attached to a Peligot's tube, which is surrounded by a freezing mixture of ice and salt. All the necessary joints are made by means of smooth and closely-fitting corks. The air-dry boron is loosely spread in the combustion tube, so that it is one-fourth inch in thickness all through ; and as the boron must be thoroughly dry the water is driven out by heating in a stream of hydrogen, also allowing it to cool in the same. Carbonic acid cannot be used, as boron reduces it completely to carbon monoxide, as noticed by Lorenz (*Ann. Chem.*, 1889, ccxlvii, p. 226). After the tube has cooled the hydrogen is forced out by a stream of dry air, and the larger end of the tube then connected with a chlorine generator. The chlorine is prepared from manganese dioxide and hydrochloric acid, and best regulated so that a slow but steady stream is obtained. The whole apparatus is filled with washed and dried chlorine gas before heat is applied, sufficient for producing a slight glow in the tube. A liquid having the color of chlorine gas condenses in the Peligot's tube, which is best connected with a good drawing chimney, as some of the trichloride goes through uncondensed. The color of the liquid is due to dissolved chlorine, which is removed by shaking the liquid with mercury in a sealed tube, which can also be used for distilling. After the liquid has become perfectly colorless, which takes about two days, the tube is opened and by means of a closely-fitting cork a narrow glass tube, twice bent at right angles, is attached. The one arm of the tube which is used as a condenser is to be about 20 inches long and projects to the bottom of the receiving vessel, which is surrounded by a freezing mixture of ice and salt. The best receiver is a wide glass tube about 25 inches long and about 5 inches below the orifice drawn out, so that the condensing tube just moves freely in the opening. The distillation is best carried on by means of warm water, very slowly, so as not to lose too much of the chloride—this boiling at 18° C. The yield of the chloride by this process is as follows : By using 8 gms. of magnesium powder for reduction the boron gave 15 gms. of the chloride, the theoretical yield being 26 gms.

ANALYSIS OF BLACKBERRY BARK.

BY GUSTAV ADOLF KRAUSS, PH. G.

Abstract from an Inaugural Essay.

The results of the analysis of the root bark of *Rubus villosus* are given in the following table:

Treatment with

Petroleum ether...	{ Volatile oil.....	0.015	0.26
	{ Wax and bitter principle.....	0.015	
	{ Fixed oil.....	0.230	
Absolute ether...	{ Gallic acid.....	0.370	1.07
	{ Resin soluble in alcohol.....	0.650	
	{ Resin insoluble in alcohol.....	0.050	
Absolute alcohol	{ Phlobaphene.....	0.870	12.72
	{ Tannin.....	6.530	
	{ Extractive.....	4.100	
	{ Villosin.....	0.800	
	{ Glucose.....	0.420	
Distilled water...	{ Mucilage.....	2.260	15.85
	{ Dextrin.....	2.500	
	{ Other carbohydrates.....	4.220	
	{ Tannin.....	4.900	
	{ Other compounds precipitated by lead acetate.....	0.550	
	{ Glucose.....	1.250	
Soda solution....	{ Saccharose.....	0.170	1.40
	{ Pectin and albuminoids.....	0.600	
Weak HCl.....	{ Phlobaphene.....	0.800	8.38
	{ Pararabin etc.....	4.800	
Chlorine.....	{ Starch.....	3.580	17.00
	{ Incrusting matter.....	18.00	
HNO ₃ and KClO ₃	Intercellular matter.....	17.00	
Residue.....	Cellulose and sand(1.35).....	16.48	
Ash.....		3.16	
Moisture.....		10.60	
Loss		0.08	
		100.00	

In the examination of the alcoholic extract evidence having been obtained of the presence of a glucoside, numerous experiments were made with the view of isolating it; the following deserve to be mentioned:

The aqueous solution of the alcoholic extract was freed from tannin by means of lead acetate, the filtrate treated with H₂S, and the clear liquid evaporated; decomposition took place with the production of an insoluble resin-like body.

The alcoholic percolate of the drug was macerated with freshly precipitated ferric hydrate; the latter, prepared from 500 cc. of solution of tersulphate of iron, is used for the tincture from 500 gm. of bark. The alcoholic filtrate, to which the washings have been added, is subjected to distillation until the alcohol has been completely removed; the cloudy residue is filtered and the filtrate, mixed with absolute ether and frequently shaken, is set aside for twelve hours, when the glucoside is separated in fine needles. A more complete precipitation takes place when chloroform is used instead of ether; but the precipitate is amorphous.

Nearly as good results are obtained by mixing the powdered drug with milk of lime, drying the mixture, exhausting it with boiling alcohol, evaporating, treating the residue with ether and subsequently dissolving in alcohol.

The glucoside, for which the name of *villosin* is proposed, forms fine silky needles melting at 173–175° C. to a brown mass; heated on platinum foil it melts and burns with a sooty flame, leaving no residue. It is freely soluble in methyl, ethyl and amyl alcohols, sparingly soluble in water, slightly soluble in petroleum benzin, insoluble in chloroform and nearly so in ether. The taste is bitter, best perceptible in the alcoholic solution. The aqueous solution is not precipitated by lead acetate, but yields a precipitate with lead subacetate. Villosin does not reduce silver nitrate, even on heating. Ferrous and ferric salts cause no change. Alkalies color lemon yellow. Sulphuric acid colors light brown, changing to deep violet with little water. Sulphuric with a drop of nitric acid colors deep orange, then red, by heat destroyed. Froehde's reagent colors dark brown, and on heating, brown green; but Froehde's reagent with a drop of nitric acid gives a red color. An aqueous solution, containing in 5 cc. 0.030 gm. of the glucoside, yielded with Fehling's solution 0.020 gm. precipitate; on boiling the solution previously with dilute acid the precipitate weighed 0.024 gm.

For estimating the tannin 10 gm. of the bark were exhausted with 93 per cent. alcohol, the tincture evaporated, and the extract dissolved in water. Using Mueller's method 9.19 per cent. of tannin were found; by Guenther's method, 9.88 per cent., and by Læwenthal's method 10.3 and 10.4 per cent. But working with cold infusions of the bark, the results were as follows: by Guenther's method 10.0 per cent., and by Læwenthal's method 11.1, 12.5 and 11.8 per cent.

NOTE ON ADULTERATED SPANISH SAFFRON.

By G. M. BERINGER, PH.G.

Read at the Pharmaceutical Meeting November 19.

Two lots of adulterated saffron have recently come under my notice. The first was of a handsome color, excellent in odor, and brought a very high price. It yielded on incineration 40 per cent. of ash. On close inspection it was found to be an admixture of vegetable fibre of unknown origin with a small quantity of genuine saffron.

The fibre was in pieces from $\frac{1}{2}$ inch to $1\frac{1}{2}$ inches long, and upon microscopic examination proved to be the stem of a monocotyledon, most likely a species of grass. This was loaded with a calcium sulphate artificially colored, and attached thereto with some saccharine substance, most likely glucose. A small quantity thrown on water soon deposited a heavy precipitate of the sulphate, tinting the water a pinkish yellow.

A portion was taken from the centre of the can, and of this 5 gms. was carefully weighed and then carefully picked over, separating the true saffron and the adulterant. The following statement exhibits the proportion of each :

·915 gms. genuine saffron.
3·745 gms. adulterant.
·240 gms. refuse so broken as to be impossible to separate.
·1 gm. loss in handling.

5·000 gms.

From these figures it would appear that the saffron contained only about 20 per cent. of genuine saffron.

The adulterant yielded 52·7 per cent. of ash, containing considerable calcium sulphide.

The coloring matter of the adulterant was found to yield an orange-yellow solution to alcohol, and when thus extracted and the solvent evaporated was obtained as an orange-red powder, which dyed silk a bright yellow and showed with reagents the following reactions: With concentrated sulphuric acid a violet-red, on diluting the color gradually fades. With concentrated hydrochloric acid a violet-red, on diluting destroyed. With sodium hydrate the color gradually fades. With ammonium hydrate the aqueous solution produces a bright yellow color. Stannous chloride and hydrochloric acid destroyed the color. Its aqueous solution is bleached by calcium hypochlorite and precipi-

tated as a pale yellow precipitate by lead acetate. These reactions point to the presence of some artificial non-vegetable coloring.

The true saffron in the mixture yielded 5.7 per cent. of ash, about the normal amount, and deposited no pulverulent substance on soaking in water.

A somewhat similar adulteration of saffron was reported by W. Brandes, *Pharm. Ztg.*, 1879, p. 506 (see *AMER. JOUR. OF PHAR.*, 1879, p. 558), who reported 50 per cent. of stems obtained from a plant belonging to the Gramineæ or Caricineæ, probably from *Cavex capillaris*, the stems being loaded with calcium carbonate previously colored with cochineal.

The second lot of saffron was genuine Spanish saffron, excellent in color and odor, contaminated with but a small quantity of the yellow styles and a few stamens, but loaded with sodium sulphate. It yielded 17 per cent. of fusible ash. The adulteration of saffron with soluble salts, such as the borate, carbonate and sulphate of sodium and ammonium salts, has been previously reported in France by M. Adrian (*Jour. de Pharmacie et de Chimie*, 1889, p. 98), and in England by E. M. Holmes (*Phar. Journ. and Trans.*, February, 1889, p. 666).

GLEANINGS FROM THE GERMAN JOURNALS.

BY FRANK X. MOERK, PH. G.

Tannin is warmly recommended in cases of severe burns and scalds, it quickly relieving pain and causing rapid healing. It is applied in 5 per cent. solution by allowing the solution to trickle over the sore; this is repeated whenever the bandage is changed; a cooling ointment is applied after the tannin solution.—*Pharm. Ztg.*, 1889, 630. (See also *AMER. JOUR. PHAR.*, 1886, p. 611.)

Sodium thiosulphate in commercial bicarbonate is occasionally found; the quantity being generally small, J. Lüttke uses the following method for its detection: A solution of the bicarbonate (1:30) is acidified with hydrochloric acid and a few cc. of a solution of barium nitrate added; in presence of *sulphate* a white turbidity is produced which must be removed by filtration after standing for some time. To the clear filtrate is now added a single drop of a solution of permanganate of potassium (1:1000) when if thiosulphate was present a white precipitate of barium sulphate is produced.—*Pharm. Ztg.*, 1889, 629.

Precipitated zinc sulphide has been used both internally and externally, with good results in chronic eczema and psoriasis. For internal use Barduzzi prescribes: Zinc sulphide 0.50, extract of gentian, sufficient to make 50 pills; from 3 to 12 pills are taken daily. Externally it is applied: Zinc sulphide 5.0, lanolin 20.0, lard 30.0.—(*D. M. Ztg.*) *Apoth. Ztg.*, 1889, 1184.

Annidalin, a patented substitute for iodoform, is an iodine derivative of thymol made by the action of iodine upon an alkaline solution of thymol. It is of a red color and in the dry state retains its color for months, if kept in the dark; in the presence of moisture or on exposure to light, iodine is liberated. This preparation is one of a new class of phenol derivatives; the corresponding compound of phenol or carbolic acid has the formula $C_6H_5I_2.OI$ and is isomeric with the well-known *triiodophenol* $C_6H_2I_3.OH$. This forms an odorless, violet-red preparation, insoluble in water and dilute acids, soluble in alcohol, ether, benzol and chloroform; it melts at $157^{\circ}C$., decomposing at the same temperature.—(*Ber. D. Chem. Ges.*) *Pharm. Centralhalle*, 1889, 637.

Oil of Cinnamon.—The adulteration of commercial oils with rosin (*AM. JOUR. PHAR.*, 1889, 575) is confirmed by the work of Dr. H. Gilbert, who also advances a simple test for the detection of this adulterant and gives some data on the resinification of oils of cinnamon. The detection of non-volatile matter is effected by exposing one gram of the oil in a flat watch-crystal to 110° – $120^{\circ}C$. in an air-bath until constant weight is obtained. Various cassia oils yielded from 5 to 30 per cent. residue, two oils (guaranteed pure) 6 and 11 per cent. and in genuine Ceylon oil 2 to 3 per cent. residue. To determine if exposure to light and air could cause such an increase of residue (20–30 per cent.) a steady current of air was passed through a sample of pure cassia oil (leaving 6 per cent. residue) and also one of pure Ceylon oil (with 2 per cent. residue) for *forty* hours; the experiments were conducted near a window so as to expose to as much sunlight as possible during the time. The residue from the cassia oil amounted to 6.5 per cent., from the Ceylon oil to 3.5 per cent.; while resinification could be detected under these favorable conditions, still it was so slight that exposure could not account for very high percentages of residue. A sample of pure cassia oil (specific gravity 1.060) after the addition of 20 per cent. rosin had the specific gravity 1.065. The crystals obtained by mixing the oil with nitric acid can not be considered as a reliable test, as adulterated oils will also give the crystals.

and a pure oil at times fails to produce them. The acidity of the oils gives important information as to the presence of rosin and is best determined by dissolving 2 gm. oil in 30 cc. alcohol, adding a few drops of phenolphthaleine and titrating with alcoholic potassium hydrate; the number of milligrams of KOH required to neutralize one gram oil gives the acidity figure.

Pure cassia oil (6 per cent. residue) 13; this was not changed by passing air through it for forty hours. Pure Ceylon oil (2 per cent. residue) 9; another sample (2.5 per cent. residue) 10. An adulterated sample of cassia oil (28 per cent. residue) 47; sample of cassia oil to which 20 per cent. rosin had been added, 40. Rosin has an acidity figure of 150. The figures just quoted render the method an important one.—*Chemiker Ztg.*, 1889, 1406.

Ricinin, the poisonous principle of castor oil seeds, is not, as has been claimed, an alkaloid, but is an albuminoid, one of the phytalbumoses and belongs to the class of unorganized ferments. Boiling its solutions almost immediately destroys its activity, while heated dry it is not easily decomposed. It can be prepared from the seeds (after removing the integuments and the oil) by percolating with a 10 per cent. salt solution. The percolate is saturated with sodium and magnesium sulphates and allowed to stand in the cold, when besides the double salt there forms a white precipitate, easily separated from the crystals, which is filtered off and transferred to a dialyzer. In the dialysis the temperature must be kept sufficiently low to prevent decomposition. The slimy mass is scraped from the septum and dried in vacuo over sulphuric acid; after drying the masses are very easily pulverized and yield an odorless white powder, still retaining from 10–20 per cent. ash which, however, does not interfere with its physiological action. The powder can be preserved for long periods; its best solvent is a 10 per cent. salt solution which for experiments can be diluted without formation of an immediate precipitate. The varieties of *Ricinus*, *Croton Tiglium* and *Jatropha Curcas* all appear to contain poisonous albuminoids which are similar, if not identical. Attention is called to the danger arising from the accumulation of castor oil press-cakes which contain a substance more poisonous than arsenic (and for which no test is known) and which can so easily be obtained by any one; the suggestion is also made that the manufacturers of castor oil should be compelled to use the press-cakes as fuel as soon as they are taken out of the press or else to mix with water

and boil to destroy the activity of the poison.—Hermann Stillmark, *Aus den Arbeiten des pharmakologischen Instituts zu Dorpat. Pharm. Centralhalle*, 1889, 650.

The Examination of Castor Oil.—The specific gravity 0.950-0.970, the deposition of crystalline floccules at 0°C., the solubility in alcohol and glacial acetic acid, and the absence of a dark brown color if 3 parts castor oil be mixed with 3 parts carbon disulphide and 2 parts sulphuric acid, while sufficient to detect foreign vegetable oils, will not detect rosin oil owing to similar behavior towards the above reagents. Rosin oil may be detected by saponification and agitation of the aqueous soap solution with ether, separating and evaporating the ethereal solution when the rosin oil will be obtained. The behavior with nitric acid of sp. gr. 1.31 is also of value. Castor oil is colored only slightly brown, while the acid solution remains colorless; in the presence of rosin oil the oily layer will be decidedly dark colored (almost black) and the acid layer will be of a brownish color. A sample of castor oil examined contained about 19 per cent. rosin oil, and gave satisfactory results with the tests first mentioned.—Dr. H. Gilbert, *Chemiker Ztg.*, 1889, 1428.

ABSTRACTS FROM THE FRENCH JOURNALS.

TRANSLATED FOR THE AMERICAN JOURNAL OF PHARMACY.

MERCURIAL FLANNELS.—Prof. Merget in a recent thesis supporting the belief that mercury cannot be absorbed by the healthy skin, and that mercury inunctions act only through the respiratory organs, which absorbed their vapor, proposed the use of mercurialized flannels to replace the inconvenient ointments now employed. M. Carles explains (*Gaz. des Sci. méd. de Bordeaux*) how these should be prepared. Thick, soft flannels should be first relieved of fatty matters by soaking for three hours in a 25 per cent. solution of bicarbonate of soda, after which they are lightly wrung out and plunged into clear water. After a second wringing, made gently—with the object of retaining a portion of the alkaline salt—they are placed for four or five hours in a saturated solution of nitrate of mercury. As strong vapors are thus disengaged, the process should be carried on under a chimney of some sort. The flannels should then be lightly soaked in a 1 to 2 solution of liquor ammoniæ and, when a grayish cast shall have been obtained upon them, should be dried in a shaded place in the open air. They are then beaten, to

remove the metallic particles,* and put away in glass-stoppered bottles. In using, a square of 25 centimeters is placed upon the chest, or, at night, in a small, open bag upon the patient's pillow within the influence of the respiratory organs. These flannels give off mercurial vapors for years, but the dose gets too weak for therapeutic purposes in about three weeks, when they should be renewed. They are eligible for use against *pediculi pubis* and other skin parasites.—*Répert. de Phar.*, Oct.

COMPOSITION OF ABSINTHE.—As one result of physiological and chemical researches made on absinthe by M. M. Cadéac and Albin Meunier (*Acad. de Méd.*, Sept. 10), the constituents of absinthe, as ordinarily made, are given as follows: volatile oils of anis, 6 gm.; of illicium, 4 gm.; absinthium, 2 gm.; coriander, 2 gm.; fennel, 2 gm.; menthe, 1 gm.; hyssop, 1 gm.; angelica, 1 gm.; melissa, 1 gm.; alcohol, 70 per of cent., colored with the fresh leaves of dead nettle [*ortie*] or parsley. The authors think that the poisonous properties of absinthe liquor are chiefly due to the oils of anis and of illicium; not that these are very toxic in the ordinary sense, but that they constitute a poison against the nervous centres, diminish muscular energy, paralyze the will, cause vertigo, trembling, stupor, etc., and, at times, epileptiform convulsions. The authors think that the wormwood contained in the liquor is nearly innocuous, and that the formula would be sufficiently amended by largely decreasing the amounts of illicium and anis contained in it.

DISINFECTANT DENTIFRICE.—Prota-Giurleo gives the following: Alcohol of 40 per cent. 500; camphor, 10; salicylic acid, 20; benzoin, 50; clove stalks, 100; hypochlorite of lime, 50; essence of anis, 20; glycerin, 500. All of the substances except the hypochlorite and anis are placed in a strong, closed flask which is subjected in a water bath to 60° C. of heat for five hours, agitating occasionally. After macerating for eight days and filtering, the hypochlorite is added, when a further maceration of eight days is given, when the anis is added and the preparation is finally filtered. The liquid should be put up in small blue or yellow phials. This preparation perfumes the mouth, whitens the teeth and frees the adherent tartar. It also hardens the gums and arrests gingival hemorrhages. For a mouth-wash two teaspoonfuls are added to a quart of water.—*Farm. Ital.*; *Boll. Ital.*; *Répert. de Phar.*, Oct.

REACTIONS OF THE NAPHTHOLS.—The naphthols are very soluble

in alcohol, ether, chloroform and the alkalies, soluble in glycerin, and sparingly soluble (20 cgm. to 1,000 gm.) in water; alcoholized water dissolves them fairly well for practical purposes. M. Verhassel presents the following list of reactions obtained directly, without previous solution:

Chloride of lime liquor.	Alpha naphthol.	Beta naphthol.
Ferrocyanide of potass.	Violet coloration.	Yellowish green.
Ferricyanide of potass.	"	Faint yellow.
Ammonia.	Brown.	Greenish yellow.
	Colorless.	Greenish.

When the naphthols are dissolved in alcohol and water, perchloride of iron gives an abundant violet precipitate with alpha naphthol, which becomes white and then disappears. With beta naphthol it gives an emerald green color, and, with an excess of the reagent, a greenish precipitate.—*J. de Phar. d'Anvers*, Sept.

REACTION OF SACCHARIN.—The solution containing saccharin is evaporated in a porcelain dish, and the residuum treated with nitric acid. A fragment of caustic potash is added, and one or two drops of 50 per cent. alcohol; the mixture is then heated. If saccharin be present the mixture turns to a violet blue color and then to red. The presence of a half milligram of saccharin may thus be detected.—*Ann. di Chim. e di Farm. et Or.; Répert. de Ph.*, Oct.

LOCAL ANÆSTHESIA WITH SELTZER WATER.—Dr. Voituriez, (*J. de sci. méd. de Lille*) recommends the use of siphons of seltzer water for this purpose, the jet being held at about ten centimeters from the region to be anæsthetized. He uses at first two or three bottles of the seltzer, which gives anæsthesia for four or five minutes, when a small additional quantity will suffice to prolong the effect.

NATIVE WYOMING SOAP.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy.—No. 63.

BY HERMANN WESTPHAL, PH. G.

This mineral, which is known locally under the name of "Native Wyoming Soap," occurs in the Blue Ridge, 30 to 40 miles west and southwest of Sundance, Wyoming Territory, at an elevation of about 5,000 feet.

It is found in two distinct forms. 1. *The wet variety*, which occurs in sink holes, or in the neighborhood of springs, and covers, probably, an area of several hundred acres. It forms a thick very tenacious

pasty mass, about the consistency of butter. Its color is light yellowish gray. Taste slightly saline, clay-like. Odor argillaceous. Moistened between the fingers with a little water it feels like soap or some greasy substance: hence its name. This soapy feel is probably due to the extreme fineness of the silicates which it contains. In hot weather, the edges of the sink holes become hard and brittle, and on some places show an efflorescence of fine crystals of magnesium sulphate.

These holes, which seem to be almost bottomless, at times become very annoying to the ranchers, as cattle frequently get into them, and unless discovered in time and pulled out are sure to perish, as it is impossible for them to free themselves.

2 *The dry variety* occurs underground in veins like coal. It is hard and dry, and looks very much like chalk; the color is somewhat darker, varying from yellowish-white to dirty greenish-yellow. On addition of a little water, however, it is converted into the soft variety as found on the surface of the earth. It appears probable that the wet variety is formed by springs running over beds of the dry soap, washing it up and in time accumulating it in large quantities.

It is used by cowboys and ranchers who live in the vicinity as a substitute for soap, and for removing grease by absorption. They also use it for making "hard water."

Five grams of the soap, exposed to the atmosphere for several weeks, at a temperature of about 24°C. lost 41.20 per cent. of moisture. It had become a very hard and brittle mass varying from dirty white, grayish-green to orange-yellow. Taste and odor were unaltered; it adhered to the tongue, and when cut with a knife exhibited a very smooth and shining surface. On ignition the wet soap lost 53.30 per cent. while the air-dry lost 12.10 per cent. corresponding to 41.20 per cent. on exposure. The air-dry soap reduced to an impalpable powder gave the following composition on analysis:

SiO ₂	61.08 per cent.
Fe ₂ O ₃	3.71 "
Al ₂ O ₃	17.12 "
MnO.....	traces
CaO.....	2.96 "
MgO.....	1.82 "
Na ₂ O.....	0.20 "
SO ₃	0.88 "
H ₂ O.....	12.10 "
Total.....	99.87 "

DIFFUSION OF ACIDS AND BASES INTO ONE ANOTHER.¹

By J. STEFAN.

When very dilute ammonia is placed over a column of dilute hydrochloric acid, the surface of separation between the acid and the alkaline liquids remains well defined, as can be easily observed if the solutions are colored with litmus, but the region occupied by the acid gradually extends upwards. In one experiment, a solution containing 1 gram-molecule of hydrochloric acid per litre was covered with a solution of ammonia containing one-sixteenth of a gram-molecule; the surface of separation rose 8.2, 16.5, and 24.5 mm. in one, four, and nine hours respectively, the rise being proportional to the square root of the time during which diffusion takes place. With the same hydrochloric acid, employing a solution of ammonia containing $\frac{1}{4}$ gram-mol., the surface of separation rose 5, 9.9, and 14.7 mm. in one, four, and nine hours respectively.

When a solution containing 1 gram-mol. of ammonia is employed, the region occupied by the acid extends upwards, rising 1.2, 2.3, and 3.5 mm. in one, four, and nine hours respectively, but when the ammonia is four times as concentrated, the surface of separation gradually sinks, and the depression is 1.2, 2.5, and 3.8 mm. in one, four, and nine hours respectively. If ammonia of a certain concentration were employed, the surface of separation would remain stationary. The concentration of the ammonia which would fulfil this condition would lie somewhere between that of the solutions employed in the last two experiments; the exact strength cannot be ascertained experimentally except with great difficulty, but it can be shown mathematically that the surface of separation would remain stationary if solutions of 1 mol. of hydrochloric acid and 1.8 mol. of ammonia respectively were employed.

The phenomena described above are determined by the relative concentrations of the acid and alkaline solutions; they are independent of their absolute values, at any rate as long as the latter are not very large.

Similar experiments were made with solutions containing 2 gram-mols. of hydrochloric acid and 0.5 gram-mol. of ammonia respectively. The region occupied by the acid extended 5, 9.9, and 14.8 mm. upwards in one, four, and nine hours' time.

¹ *Monatsh.*, x, 201-219; reprinted from *Jour. Chem. Soc.*, 1889, p. 1046.

When the hydrochloric acid solution contains only $\frac{1}{16}$ gram-mol., and the ammonia 1 mol., the surface of separation falls 3.9, 8.2, and 11.9 mm. in one, four, and nine hours respectively; with solutions containing 1.5 gram-mol. of hydrochloric acid and 12 gram-mols. of ammonia respectively, the surface of separation falls 3.9, 8.4, and 11.6 mm. in the same times. In those experiments in which the region occupied by the ammoniacal liquid extends downwards, the two solutions do not remain so sharply separated, and the surface of separation is often irregular.

In one experiment with solutions containing 1 gram-mol. of soda and $\frac{1}{16}$ gram-mol. of acetic acid respectively, the region occupied by the alkaline liquid extended 5.8, 11.6, and 17.4 mm. upwards in one, four, and nine hours, and 28.5, 40.5, and 39.7 mm. in one, two, and three days respectively.

The apparatus employed in these experiments consists of two graduated glass tubes (120 mm. in length, 7 mm. in internal and 23 mm. external diameter), fixed, with their open ends turned towards each other, on a perpendicular brass stand, so that they can be moved up and down or rotated round the stand. The open ends have ground edges, the other extremities being closed with glass plates, fastened on with cement. The underneath tube is filled *in situ*; the other is filled, then inverted, and any liquid which falls out replaced with a small pipette. At the commencement of the experiment the open ends of the two tubes are brought to the same level, and they are then rotated until the one is exactly over the other.

The author discusses the phenomena of diffusion mathematically, and, from the data given above, the coefficient of diffusion of ammonia is found to be 0.92, and that of hydrochloric acid 3.02.

From observations made in a similar manner with ammonia and various acids, the diffusion coefficients are found to be as follows:—Nitric acid, 2.93; sulphuric acid, 1.82; oxalic acid, 1.14; and acetic acid, 0.88. In all the experiments, solutions containing one equivalent of the acid and $\frac{1}{16}$ of an equivalent of ammonia respectively were employed. In two experiments in which solutions of one equivalent of base and $\frac{1}{16}$ of an equivalent of acetic acid were employed, the diffusion coefficient of potash was found to be 0.73, and that of soda 1.57. The above values are for the temperature of 21°.

The diffusion coefficients of hydrochloric acid, nitric acid, and sulphuric acid are considerably larger than those found by Scheffer (*Zeit.*

physikal. Chem., ii, 390-404) by the ordinary methods, but the results are not comparable, as Scheffer experimented at lower temperatures; the coefficients found for the other substances agree better, and in some cases very well. The diffusion coefficients found for the three acids named above, and those of potash and soda, are in the same ratio as the molecular conductivities of these electrolytes as determined by Kohlrausch; but the coefficients of oxalic acid, acetic acid, and ammonia are larger than they should be if they followed the same rule. The diffusion coefficients, and those values which are termed the coefficients of chemical affinity, also stand in a direct relation to one another.

ON SOME SODIUM AND MANGANESE COMPOUNDS.¹

MANUFACTURE OF SODIUM SULPHIDE.

Sodium sulphide is generally made either by double decomposition or by reduction of sodium sulphate. The former process was described by W. Weldon. Another process of double decomposition is that of barium sulphide and sodium sulphate, but this process is only practicable where there is a ready sale for barium sulphate as "blanc fixe." As regards the reduction of sodium sulphate, this article is ground to a coarse powder, mixed with coal-dust in the proportion of 3 to 2, and the mixture heated in a reverberatory furnace. The furnace is 6 meters long, 2 meters wide, 1.7 meters high, and well lined with fire-brick. The bed is divided into two portions, that next to the fire-bridge for the reduction, and the other for the preliminary heating of the charge, which may consist of 150 kilos. of sodium sulphate and 100 kilos. of coal. About 1 $\frac{3}{4}$ hours are required for the reduction of this charge. At the end of the operation the fluxed mass is run into iron boxes which are well closed, in order to prevent oxidation. Perhaps a revolving furnace may yet be employed for the reduction, although a few experiments in this direction gave unsatisfactory results. The mass obtained from the furnace weighs about 110 to 115 kilos., and contains up to 60 per cent. of sodium sulphide. Its appearance should be red and porous, but not gray and dense. The cooled mass is broken up into large balls, and thrown into lixiviating vats, arranged and fitted on the same principle as black-ash vats. The lixiviation is performed with warm water, and the liquor running from the strongest vat stands at 32° B. It is allowed to

¹ *Jour. Soc. Chem. Ind.; Oil, Paint and Drug Reporter.*

settle for an hour or so, and afterwards run into shallow iron crystallizing pans, where, after four or five days, a copious crop of yellow or brown crystals is formed having the formula $\text{Na}_2\text{S} + 9\text{H}_2\text{O}$. The mother-liquor is siphoned off and again boiled down to 31°B . for further crystallization. The large crystals formed are broken up, allowed to drain, and ultimately jigged in a centrifugal machine, whereby they obtain a lighter appearance. Dark crystals are washed with light concentrated liquor, which improves their appearance. The salts obtained during the concentration of the liquors, owing to their oxidation, are employed in the furnace in the place of sodium sulphate.

MANUFACTURE OF SODIUM NITRITE.

Sodium nitrite is one of the most important chemicals used in the manufacture of azo dyes. There exist several methods for its manufacture, all of which are based on the reduction of sodium nitrate by means of lead. For this purpose the latter is fused and poured on iron plates in thin layers. After cooling, the lead plates are rolled up, and weighed out in parcels for use. The lead should be free from zinc and antimony. The sodium nitrate is then fused in shallow cast-iron pans fitted with a mechanical agitator, and when the mass is thoroughly fused, two and a half parts of lead are added at short intervals for each part of sodium nitrate (95–96 per cent. NaNO_3). The reduction ensues immediately. The thin leaves of lead fuse easily, and are oxidized to yellow lead oxide (litharge). After some time a further amount of lead is added, as an excess of lead is necessary, and the agitation of the fused mass is continued for at least three-quarters of an hour, in order to obtain a product of high strength. The mass has a tendency to stick to the sides, and great care must be exercised to remove these crusts with an iron spatula, as the slightest inattention causes the burning through of the pan. If the crusts turn reddish, it is a certain sign that the pan is in great danger of being destroyed. These crusts must at once be covered by a fresh quantity of nitrate, and the fire withdrawn if necessary. The whole process of fusion is finished in about $3\frac{1}{2}$ hours. A sample drawn should test at least 90 per cent. of sodium nitrite. The mass after cooling is lixiviated in wrought-iron tanks with water or weak liquor. As soon as the solution stands at 36° to 38°B . it is siphoned off and neutralized with nitric acid of 1.029 specific gravity. The liquor is then concentrated to 42° or 43°B ., allowed to clarify for

three or four hours, and ultimately run into lead-lined wooden tanks. Crystals of a light yellow color quickly make their appearance, which are deprived of their adherent moisture in the customary manner. The mother liquor, in conjunction with other liquors, is again boiled down to crystallization. In this way crystals are obtained of the following percentage :—

	NaNO ₂ Per cent.
1st crystallization.....	95.5 to 95.5
2d crystallization.....	94.8 to 95.5
3d crystallization.....	94.2 to 94.5
4th crystallization ..	94.0 to 94.2

By drying at 60° C. their percentage is increased to 96 per cent. If a purer product be required, it must be recrystallized. Some difficulty is experienced in working up the mother liquors. If crystals of only 94 per cent. of NaNO₂, or below that strength, be obtained, the mother liquors must be concentrated by themselves in pan No. 2. Here crystals containing 86 to 92 per cent. of NaNO₂ are produced, which are employed for enriching the strength of fresh liquors. If the crystals from pan No. 2 sink below 80 per cent. their mother liquors must be concentrated separately in pan No. 3, whereby crystals containing 50 to 75 per cent. of NaNO₂ are obtained. These serve for enriching the liquors in pan No. 2. Weaker crystals are returned to the melting pot and treated with lead. Nevertheless, it is sometimes difficult to avoid the formation of salts, which require a special treatment in every case.

The lead oxide, obtained as a by-product, is washed, and afterwards converted into the different lead preparations of commerce, or reduced to metallic lead, when it returns to the process.

ACTION OF AIR ON MANGANESE CARBONATE.

At the ordinary temperature carbonate of manganese, whether native, precipitated, or crystallized from solution in carbonic acid water, is oxidized with difficulty whether exposed to air or to aerated water. In the most favorable case—the precipitated carbonate kept for ten years in aerated water—the proportion of oxygen combined was only that required to form MnO₂MnO. The same compound, produced by directly combining an equivalent of hydrated manganese dioxide with one of hydrated manganese monoxide, does not absorb any additional oxygen, even after five months' exposure to air or water. Manganite, MnO₂MnO, is then the limit of oxidation at the

ordinary temperature. At 100°, however, and still more at 200°, the carbonate, the protoxide and the sesquioxide readily undergo oxidation beyond this point, and may be perhaps completely converted into dioxide. The author concludes, in the absence of any analyses showing the native dioxide of manganese to have been produced from the carbonate, that such has not been the case.

FORMATION OF HYDROGEN PEROXIDE FROM PERSULPHURIC ACID.¹

BY M. TRAUBE.

To determine whether oxalic acid is oxidized by persulphuric acid (SO_4) in 70 per cent. sulphuric acid solution as stated by Richarz (*Ber.* xxi, 1670), the author added a known quantity of oxalic acid, dissolved in 70 per cent. sulphuric acid, to 70 per cent. sulphuric acid containing a known quantity of persulphuric acid, and passed a stream of air, free from carbonic anhydride, through the mixture for three hours; not a trace of carbonic anhydride was evolved. The mixture was then made up to 100 cc. with 70 per cent. sulphuric acid, and (1) the quantity of oxalic acid, (2) the total available oxygen, (3) the available oxygen in the hydrogen peroxide, and (4) the available oxygen in the persulphuric acid determined. The results showed that oxalic acid is not acted on by persulphuric acid in presence of 70 per cent. sulphuric acid, and that, in the first two or three hours, more than two-thirds of the persulphuric acid is decomposed, and its available oxygen almost completely converted into hydrogen peroxide. When the experiments described above occupied more than two or three hours carbonic anhydride was evolved, owing to the oxidation of the oxalic acid by the hydrogen peroxide; at low temperatures (8–10°), however, the evolution of carbonic oxide was very slight.

It was proved by similar experiments that carbonic oxide is not oxidized by a 70 per cent. sulphuric acid solution of persulphuric acid, and that within 3½ hours, more than two-thirds of the available oxygen is converted into hydrogen peroxide. As, therefore, persulphuric acid is such a feeble oxidizing agent, it cannot be true that it oxidizes water, as is stated by Richarz (*loc. cit.*).

When a 40 per cent. sulphuric acid solution (20 cc.) of persulphuric acid (= 16 milligrams of the available oxygen), free from hydrogen peroxide, is diluted with water, neutralized with barium carbonate, and

¹ *Berichte*, xxii, 1518–1528; reprinted from *Jour. Chem. Society*, 1889, p. 940.

filtered, the filtrate contains hydrogen peroxide (= 7.4 milligrams of available oxygen); this experiment shows that Richarz's view (*loc. cit.*) that hydrogen peroxide is only formed from persulphuric acid in 70 per cent. sulphuric acid solution, is untenable.

Violet chromic sulphate is not oxidized to chromic acid by a 40 per cent. sulphuric acid solution of persulphuric acid; when chromic acid is treated with persulphuric acid in 70 per cent. sulphuric acid solution, it is reduced to chromic oxide in consequence of the formation of hydrogen peroxide.

Persulphuric acid also differs from other powerful oxidizing agents in this, that in 70 per cent. sulphuric acid solution it does not decompose, but actually gives rise to hydrogen peroxide. Quantitative experiments showed that when hydrogen peroxide and persulphuric acid are present together in 40 per cent. sulphuric acid solution, they are both very slowly decomposed, equal molecules of the two compounds being destroyed, but a similar solution of either compound alone undergoes no considerable change within 48 hours.

Persulphuric acid does not act on organic compounds, or has, at the most, only a very slight action. In 40 per cent. sulphuric acid solution, it does not decolorize indigosulphonic acid until after half an hour's time, and a solution in dilute sulphuric acid (about 10 per cent.) can be filtered through paper without any reduction taking place. Neutral solutions of persulphuric acid are only very slowly reduced by alcohol, but arsenious acid is completely oxidized within a short time. Berthelot (1878,) has stated that arsenious acid is not acted on by persulphuric acid.

The following reactions show that persulphuric acid belongs to the class of oxygen molecule compounds (holoxides). Platinum, either in the form of wire or as platinum black, decomposes persulphuric acid with evolution of oxygen, but only in the presence of acid. A neutral or slightly acid solution of persulphuric acid oxidizes indigosulphonic acid only slowly, but immediately on adding ferrous sulphate. Persulphuric acid and hydrogen peroxide, when present together, behave like two holoxides. Persulphuric acid sometimes behaves as a reducing agent; a solution of 40 per cent. sulphuric acid, free from hydrogen peroxide, reduces lead peroxide, the hydrate of manganese dioxide, and silver peroxide.

The article concludes with a discussion of the existence of oxygen-molecule compounds, which is principally controversial.

A CONTRIBUTION TO THE DIETETICS OF ALCOHOL.¹

By DR. ALEXEI M. MOHILANSKY.

In order to study the action produced by an occasional (dietetic) use of alcohol on the nitrogenous metabolism and the assimilation of proteids and fats, Dr. Mohilansky, house physician to Professor V. A. Manasseïn's clinic, has undertaken careful experiments on 15 healthy men (mostly medical students), aged from 18 to 28. Some of the subjects were total abstainers; some were occasional, and others habitual alcohol drinkers. The administration of alcohol varied according to the subject's habit, the daily dose oscillating between 60 and 140 ccm. of absolute alcohol, or from four small wineglassfuls (rūmka) to half-a-bottle of a 40 or 42 per cent. vodka (aquavit). To put it otherwise, the beverage was given in a dose sufficient to produce a slight intoxication (high spirits and talkativeness, etc.). The principal results of Dr. Mohilansky's important and very instructive researches may be given somewhat as follows:—

(1) In habituated people, alcohol, when taken in moderate quantities, distinctly improves appetite and gives rise to a marked increase in the assimilation of the nitrogenous constituents of food, the average surplus amounting to 2.09 per cent., the maximal to 4.22 [*e. g.*, a patient who had been assimilating 93.10 per cent. of nitrogen, without alcohol, proved to be assimilating 96.07 per cent. when alcohol was added to his dietary].

(2) In habitual total abstainers, however, the assimilation somewhat sinks (0.28 or 0.33 per cent.).

(3) The increased assimilation in the former category must be attributed to a more complete absorption and intensified gastric digestion, which result from a prolonged retention of food in the stomach, on one side, and from increased digestive power and secretion of the gastric juice (Claude Bernard, Kretschy, Richet, Lever, Petit et Sémerie, Glucinski).

(4) The nitrogenous metabolism, or disintegration of systemic proteids, almost invariably (in 13 out of 15 cases) decreases, the average fall being 8.73 per cent., the maximal 19.42, the minimal 0.14 [*e. g.*, in a patient in whom the metamorphosis in non-alcoholic days had amounted to 80.11 per cent., in alcoholic ones it fell to 63.78]. The decrease is observed very frequently even when small doses are taken;

¹ Condensed from a St. Petersburg Inaugural Dissertation, 1889, by Valerius Idelson; reprinted from *The Medical Chronicle*, November, 1889.

it is invariable in the case of moderate or middle-sized ones. However, there does not exist any strict parallelism between the dose and the amount of the inhibition of the metabolism.

(5) The decrease remains still perceptible for some while, even after discontinuing alcohol.

(6) It is probably dependent mainly upon alcohol inhibiting the systemic oxidation processes (V. A. Manasseïn, Schmiedeberg, Boecker), and further, upon its deviating the blood pressure, dilating blood-vessels, retarding the circulation, and depressing the bodily temperature.

(7) Alcohol also diminishes somewhat the assimilation of fats (to judge from the fact that the amount of fatty acids eliminated with fæces is augmented).

(8) It does not possess any diuretic action; on the contrary, it rather tends to inhibit the elimination of water by the kidney, which after all, should be expected beforehand, since alcohol dilates cutaneous blood-vessels and depresses the arterial tension, that is, favors cutaneous perspiration, and interferes with the renal action. [As a matter of fact, in two patients, the daily amount of the urine remained unaltered; in five, it increased on an average 7 per cent., while in eight it fell 12 per cent.].

(9) Such organs as are not habituated to the use of alcohol show a much stronger reaction towards the substance than habituated ones.

THE RESIN OF MYOPORUM PLATYCARPUM.

By J. H. MAIDEN, F.L.S., Curator of the Technological Museum, Sydney.

A veritable natural sealing-wax is yielded by a small tree which is found in the interior of Australia; it occurs in the more arid portions of all the colonies except Queensland. The tree is *Myoporum platycarpum*, R. Br., and it possesses a variety of local names, such as "Sandalwood," "Dogwood," and "Sugar tree;" the latter because a manna exudes from it which is greedily sought after by the blacks, and is likewise much appreciated by colonists. It yields a resin, which is used by the aboriginals as a substitute for pitch and wax; for example, they use it either alone, or mixed with fat, to cement the stone heads of their tomahawks to the fibre which joins them to the stick forming the handle. As has been already hinted, it forms a natural sealing-wax, and is sometimes used by people in

the interior for this purpose. It would probably serve as a constituent of black sealing-wax; alone it is too soft for keeping in this climate.

It sometimes occurs in great quantities on the stem, is hard and brittle, breaks with a glassy fracture which is at first of a purple or indigo color, but becomes brown on keeping. Often it may be picked up from under the trees in rounded or globular pieces.

Two samples have come into the writer's hands, and a few notes concerning them will doubtless be interesting. The first, from the Lachlan River, New South Wales, is in small rounded lumps usually weathered on the outside, and having a pleasant empyreumatic odor; these are of a dark reddish-brown color, fly with the slightest touch of the pestle, and are easily powdered. The resin has a bright fracture, which appears almost black, but shows reddish-brown at the edges. It softens even with the warmth of the hand, and if kept in a bottle, the heat of an average summer day is sufficient to fuse pieces presenting fresh fractures.

It presents some external resemblance to guaiacum resin (especially when that substance comes to market in small lumps), but it is not so green in color as the latter. It has no taste. Cold water has no effect on it, but if the water be heated the resin melts and floats, forming a liquid much resembling tar, but of a purplish-brown color. The water remains clear, colorless and almost odorless.

Light petroleum dissolves 46.8 per cent. of a reddish-brown resin, destitute of odor. Alcohol dissolves from the residue 28.1 per cent. of a deep reddish-brown resin, which is almost black by reflected light.

The residue was boiled in water and 1.7 per cent. of saline matter was extracted, while 23.4 per cent. of accidental impurity was left behind. This is of a chocolate color, and under a lens was seen to consist of a little ligneous matter, with a large percentage of inorganic impurity. It was quite free from gum.

Summary.

α -Resin soluble in light petroleum.....	46.8
β - " " alcohol.....	28.1
Saline matters.....	1.7
Accidental impurity.....	23.4

100.0

The crude resin melts at 90.5° . It contains no tannic acid.

The second sample was procured from Netallie, Wilcannia, New South Wales. It presents no marked points of difference, as regards physical appearance, from the preceding one. On treating it with alcohol, the liquid is not so dark as that yielded by the preceding sample, neither is the color so rich. It resembles tawny port, but is a little darker.

Light petroleum extracts 48.6 per cent. of resin, and alcohol added to the residue extracts 36.4 per cent.—*Journal Chem. Soc.*, 1889, p. 665.

THE TOXIC ACTION OF THE ALBUMOSE FROM THE SEEDS OF *ABRUS PRECATORIUS*.¹

BY DR. SIDNEY MARTIN.

In a previous communication (see *AMERICAN JOURNAL OF PHARMACY*, 1887, page 503) the author demonstrated the presence of two proteids in the seeds of the *Abrus precatorius* or jequirity plant—a globulin and an albumose—and also discussed the physiological action of the globulin. The present paper deals with the physiological action of the albumose. The symptoms produced by injecting hypodermically the albumose are increasing weakness, with rapid breathing, without convulsions or paralysis. The post-mortem appearances are local œdema or ecchymosis, and gastro-enteritis with occasionally petechiæ on the serous membranes; the blood usually dark and fluid. When applied directly to the eye the albumose causes severe conjunctivitis and chemosis.

The poisonous action of the albumose is completely destroyed by boiling the solution. Up to 50° C. no effect is produced; at 70° to 75° C. the albumose is still poisonous, but not nearly to so great a degree as previous to heating; at 80° C. a still further diminution in activity is produced. The action of the albumose in producing conjunctivitis is also diminished by heat. It will be seen that there is a great resemblance in chemical composition between the abrus-poison and the toxic principle of snake-venom. Weir Mitchell and Reichert describe the venom of the rattlesnake as consisting of a globulin and a peptone. The latter, however, is not a true peptone, and is probably closely allied to the albumose class of proteids. If the venom of

¹*Proc. Royal Society*, vol. xlv; reprinted from *The Medical Chronicle*, November, 1889.

snake poison is heated, its activity is diminished and in some cases destroyed, the globulin being coagulated and the peptone-like body decomposed.

The results obtained may be thus summarized: The toxic principle of the jequirity resides in two proteids present in the seeds—a para-globulin and an albumose, which practically possess the same toxic properties. The activity of both these proteids is destroyed by moist heat. The snake-venom resembles abrus-poison in chemical composition, in its power of producing local lesions, of reducing body temperature and rendering the blood fluid after death, and to some extent in the effect on it of moist heat. Abrus-poison, however, is much less active than snake-venom. The fatal dose of snake-venom varies according to the species of snake from 0.0021 gm. to 0.000079 gm. per kilo. of body weight, whilst abrus-poison stands at globulin 0.01 gm., albumose 0.06 gm. per kilo. of bodily weight.

BOTANY BAY OR EUCALYPTUS KINO.

By J. H. MAIDEN, F. L. S., F. C. S., Etc., Curator of the Technological Museum of New South Wales, Sydney.

The first part of the author's interesting paper, published in *Phar. Jour. and Trans.*, September 21, states that in Australia, kinos are largely used in rural medicine, on account of their astringent properties, aqueous solutions being almost invariably made. Some of them are used by the settlers for ink, or for staining leather black, the process simply consisting in boiling the kino in an iron saucepan. The commerce with Europe and America in eucalyptus kino has never been important. A good kino of uniform composition, offered by Mr. Bosisto, is collected from *E. rostrata*.

Wounding the bark stimulates the flow of kino in some cases, but such a practice does not appear to be systematically resorted to. Usually it is collected from the outside, which accounts for its occasional admixture with particles of bark, but sometimes it is contained between the concentric layers of the wood (chiefly in the case of *E. corymbosa*). In the latter case it has communication with the outside of the tree, though frequently the passage is blocked with indurated kino, which has to be removed to enable the store inside to be drawn off.

The eucalypts are popularly known in Australia as "gum trees," but certain species from the structure of their bark are called "iron barks" and "stringybarks." The "gums" are locally distinguished

as red, white, blue and by other adjectives. The adjective is in one district employed to describe the leaves, in another the bark, and so on. Thus a "white gum" may be intended to denote a tree with white leaves, white bark, etc. The variations in some trees in different localities, due to climate, soil and similar causes, are sufficient to render terms like "white gum," etc., which may in some way describe a species in one district, totally inapplicable in another.

Classification of Eucalyptus Kinos.—*Eucalyptus kinos* can be very simply classified according to their behavior with alcohol or water. In all cases the writer made the tinctures of the strength of tinct. kino, B. P. The kinos experimented upon by the writer fall into three groups, which he has called, the Ruby group, the Gummy group, and the Turbid group respectively.

a. *Ruby Group*:—

<i>E. amygdalina</i> , Labill.	<i>E. piperita</i> , Sm.
<i>E. eugenioides</i> , Sieb.	<i>E. Sieberiana</i> , F. v. M. (syn. <i>E. virgata</i> , [Sieb.].)
<i>E. hamastoma</i> , Sm.	<i>E. stellulata</i> , Sieb.
<i>E. macrorrhyncha</i> , F. v. M.	<i>E. melliodora</i> , A. Cunn.
<i>E. pitularis</i> , Sm.	<i>E. obliqua</i> , L'Her.

In the preparation of a tincture all the above kinos tend to dissolve entirely, forming clear ruby solutions of approximately the same tint. They also form clear ruby solutions to cold water, hardly differing in appearance from the tinctures. The aqueous solution of the alcoholic extract is similar in appearance. Members of this group are not very friable, breaking down into clean angular fragments, and never forming an impalpable powder. If acetate of lead or of copper be added to a moderately strong solution of these kinos, so strongly gelatinous a precipitate will be formed that the test-tube may be inverted without any liquid spilling. This distinguishes them, in one respect, from the Turbid Group.

At present I know of no constant characteristics to aid in further sub-dividing this group. The stringy barks (*E. obliqua*, *macrorrhyncha*, etc.) may often be distinguished (as a group) by means of fibrous bark either attaching to individual fragments of kino, or loose with a parcel of it, but it must be borne in mind that many other species (e. g., *piperita*) have more or less stringy bark.

b. *Gummy Group*:—

<i>E. leucorylon</i> , F. v. M.	<i>E. resinifera</i> , Sm.	<i>E. saligna</i> , Sm.
<i>E. paniculata</i> , Sm.	<i>E. robusta</i> , Sm.	<i>E. siderophloia</i> , Benth.

In spirit, these kinos scarcely dissolve, leaving abundant granular residue of gum. Supernatant liquid perfectly clear. These kinos tend to be perfectly soluble in cold water, and age seems to have but little effect on them in this respect. They are like the Ruby kinos in not forming impalpable powders, being even tougher than the members of that group. They form gelatinous precipitates with some metallic acetates, like the Ruby group.

c. Turbid Group:—

E. goniocalyx, F. v. M.

E. hemiphloia, F. v. M.

E. rostrata, Schl.

E. punctata, DC.

E. odorata, Behr.

E. Gunnii, Hook.

E. Stuartiana, F. v. M.

E. viminalis, Labill.

E. terminalis, F. v. M.

Angophora lanceolata, Cav.

A. intermedia, DC.

The above yield orange-brown solutions.

E. corymbosa, Sm., yields solutions up to the brightest ruby.

E. microcorys, F. v. M., and *E. maculata*, Hook., yield solutions of various shades, from lemon-yellow to orange-brown.

All the members of this group yield turbid solutions to spirit, which require long standing or filtering to become clear. They behave in a similar manner to water, but become clear on boiling, indicating catechin. The aqueous solutions of the alcoholic extract are likewise turbid. They are all more or less friable, forming impalpable powders usually by pressure of the fingers. Addition of acetate of lead or copper produces only a very slight gelatinous precipitate, thus dividing them from the other two groups.

Sub-division of the Group.—*E. corymbosa* kino is usually so brilliant in color, and yields such rich-colored tinctures that it cannot well be mistaken for any other kino.

E. microcorys and *E. maculata* are often externally much alike, but they may be distinguished (1) by the facility with which the former dissolves in water, (2) by the yellow color which the latter yields to ether.

E. maculata, *E. punctata* and *A. lanceolata* possess odors. The essential oils which cause them may be removed by ether.

Definition of the terms "Botany Bay Kino" or "Australian Kino."
Not the product of E. resinifera.—I propose to investigate the claim of certain species to be yielders of the kino which for over one hundred years has passed under one or other of the above names. The first published allusion to this kino will be found at p. 233, *Journal of a*

Voyage to New South Wales, by John White, Esq., Surgeon-General to the Settlement, London, 1790. A plant is figured (flower-buds and bark), described by Dr. (afterwards Sir) James Smith, who wrote the botanical portion of White's book, as a new species, *Eucalyptus resinifera*, and the kino is thus alluded to:—"On making incisions in the trunk of this tree, large quantities of red resinous juice are obtained, sometimes even more than 60 gallons from a single tree. When this juice is dried, it becomes a very powerfully astringent gum-resin, of a red color, much resembling that known in the shops by the name of kino, and for all medical purposes fully as efficacious. Mr. White administered it to a great number of patients in the dysentery which prevailed much soon after the landing of the convicts, and in no single instance found it to fail. This gum resin dissolves almost entirely in spirit of wine, to which it gives a blood-red tincture. Water dissolves about one-sixth part only, and the watery solution is of a bright red. Both these solutions are powerfully astringent." What particular tree is indicated in the above passage will probably never be known. The sample of bark figured is smooth and scribbly, like that of *E. hæmastoma* perhaps, and certainly as unlike that of the two trees named by Sir James Smith and Allan Cunningham, *E. resinifera*¹ (*vide infra*), as it is possible for it to be. Only two trees in the Sydney district yield kino in anything like the abundance it was alleged to have been yielded by the *E. resinifera* of Smith. They are *E. corymbosa* and *Angophora intermedia*, but although I am well acquainted with these trees, and have made the matter of exudations of our native trees my special observation for over three years, the highest reliable estimate of the quantity yielded by either of them would not be more than one-third of the quantity mentioned by White. The red color would, however, exclude the *Angophora*, while *E. corymbosa* yields a "blood-red tincture" to spirit of wine, and dissolves almost entirely in that liquid, but such a kino would be readily and almost entirely soluble in cold water. Smith's description also contains the statement: "The wood is extremely brittle, and from the large quantity of resinous gum it contains is of little use but for firewood." Not too much stress should be laid upon an expression of opinion of the value of a timber made only a few months after the settlement of this continent, but the description of the wood being full

¹ *E. punctata* (included in *E. resinifera*) has a smoothish bark, but is not scribbly.

of gum-resins almost certainly applies to *E. corymbosa*, or to an *Angophora*. But the flower-buds figured are of a eucalypt (and that excludes *Angophora*), while they are as unlike those of *E. corymbosa* as possible. The bark figured is smooth, the flower-buds have something the shape of those of *E. punctata* (included by Bentham under Smith's *resinifera*), while the strongly-compressed peduncle, all taken in conjunction with the smooth bark (*E. resinifera* bark is never smooth, except occasionally on the branches), may show that Smith's figures refer to *E. punctata*. But the kino of *E. punctata* is liver colored or reddish-brown, and that description does not tally with that of White. All this tends to prove the truth of my original assertion, that the origin of the figures in White's book will probably never be known. As likely as not the bark and the flower-buds (no other parts being figured) were from different species.

It will be seen later on that the name *resinifera* was a singularly unfortunate one to apply to any species of eucalyptus, firstly, because they are nearly free from resin, and secondly, because scores of species yield this exudation (called "gum resin" by Smith) very freely. All kinos yielded by eucalypts, if they have been exuded sufficiently long, will be found, at a certain stage, to be only soluble in water to the extent of one-sixth, but *eucalyptus kino* almost entirely soluble in spirit, and at the same time only one-sixth in water, is an impossibility.

White's description (for although penned by Smith, the substance of it must have been supplied by White) has partly been copied by many subsequent authors. A few extracts will suffice.

"*E. resinifera*, the brown gum tree of New Holland, furnishes Botany Bay kino. A single tree will yield 60 gallons." Balfour, "Manual of Botany." *E. robusta* is the only eucalypt ever known as "brown gum," but that species neither exudes kino freely, nor is the product readily soluble in spirit.

"*Botany Bay Kino*.—The substance called by this name is the produce of *Eucalyptus resinifera* (Myrtaceæ), and other species of eucalyptus, natives of Australia and Tasmania. It appears to be a kind of extract, and has properties similar to the official kino." (Pereira, "Materia Medica"). The surmise as to its being an extract has already been dealt with.

"*E. resinifera*, the Ironbark tree, a native of Australia and Van Diemen's Land, and several other species, yield an astringent substance called eucalyptus, or Botany Bay kino. The kino resembles in

its properties the official catechu and kino, and may be used for a similar purpose." (Bentley, "Manual of Botany"). The Ironbark tree above alluded to is the *E. resinifera* of A. Cunn. (*E. siderophloia*, Benth.), but neither it nor the *E. resinifera* of Smith extends to Tasmania.

As has already been mentioned, there are two eucalypts called *E. resinifera*. They are:—

1. *E. resinifera*, Smith (White's "Voyages," p. 233; "B. Fl.," iii, 245; figured in Decade I. of Mueller's "Eucalyptographia"). It is commonly called "Red or Forest Mahogany," and is the tree to which the species-name attaches by priority.

2. *E. resinifera*, A. Cunn. (Syn., *E. siderophloia*, Benth.); "B. Fl.," iii, 220. Figured in Dec. IV. of Mueller's "Eucalyptographia."

"Ironbark" or "Red Ironbark."—At the latter place Baron Mueller states, "The Rev. Dr. Woolls observes that the Botany Bay kino is more extensively obtained from *E. siderophloia* than from *E. resinifera* (Smith, of course), which, as the specific name implies, is generally regarded as the main or even sole source of that drug." And Dr. Woolls, in his "Plants of New South Wales," (1885), states, "The Botany Bay kino was procured principally from this species, and hence Allan Cunningham and other botanists were accustomed to call it *E. resinifera*."

But what are the characteristics of kino? The official kino (*Pterocarpus Marsupium*) is, according to the British Pharmacopœia of 1885, "almost entirely soluble in rectified spirit." This is an important property, and on it the tinct. kino B. P. is based. Works on materia medica, while pointing out certain unimportant points of dissimilarity between the official and eucalyptus kino, never state that the latter does not dissolve in rectified spirit, while some make the specific statement that it is soluble in that liquid. But my experiments have shown that no kino is more insoluble in spirit than that of *E. siderophloia*. I obtained four samples from widely different localities in New South Wales and Queensland, and collected at different times. They all agree in their very partial solubility in alcohol, by reason of the very high percentage of gum they contain. The *E. resinifera* of Smith is also comparatively little soluble in spirit, for a similar reason. For this reason alone, I do not hesitate to say that "Botany Bay kino" is neither the produce of *E. resinifera*, Smith, nor *E. resinifera* A. Cunn. Both these kinos would be quite

useless for the preparation of a tincture, and would never be thought of a second time by any person who had made the experiment on either; it is therefore quite certain that these species have not caused pharmacists to use eucalyptus kino more or less for a century, but rather, it has doubtless been the admixture of such kinos as these with such eucalyptus kinos as are freely soluble in spirit, which has helped to bring eucalyptus kino into disrepute.

I now give a list of species which satisfy the requirements of the B. P., and it is hoped that systematic endeavors will be made to place kinos, which do, or should come into that list on the market. Eucalyptus kino was official in the Edinburgh Dispensatory of 1811, but the different substances supplied under the same name doubtless led to its omission.

1. All members of the Ruby group.

2. The following members of the Turbid group:

E. goniocalyx, *E. hemiphloia*, *E. rostrata*, *E. punctata*, *E. odorata*, *E. Gunnii*, *E. Stuartiana*, *E. viminalis*, *E. terminalis*, *E. corymbosa*.

The remaining members of the turbid group in my list must be for the present omitted, on account of their color; perhaps *E. punctata* would have to be rejected only on that account.

All members of the gummy group must be rejected.

Important Note.—The above list only contains those species which I have proved by experiment to be suitable. I can therefore guarantee them, and will only add others to the list as opportunities occur for testing them by other chemists or myself.

I suppose it is too much to expect that the specific name of *resinifera* shall be abandoned for any eucalypt. I know it is against botanical rules; but if the specific name *virgata* could be suppressed on account of the stature of a eucalypt, I think, on the ground of expediency, Baron Mueller may well suppress Smith's *E. resinifera*,¹ for this name has impeded attempts to obtain a knowledge of our kinos for a century. I have already specifically referred to two objections to the use of *E. resinifera* for Smith's species, and would now emphasize that it is a poor yielder of a poor kino. Out of nearly one hundred and fifty species of eucalyptus, most of them (perhaps all) yield it more or less, and of those which yield it most abundantly it is difficult to say which produces it the most freely, and to which

¹ Another eucalyptus is usually called by a false name, the essential oils being generally labelled *E. Globulus*.

the term "resinifera" would by right belong. Probably to *E. corymbosa*. But the name should be suppressed.

Gelatinization of Tincture of Kino.—The gelatinization of tincture of kino, by which it forms a substance like red-currant jelly, and more or less devoid of astringency, remains an unsettled question, although it has often been alluded to in journals devoted to pharmacy¹ during the last half century. Pereira following Thomson, and most other writers on materia medica following Pereira, state that where gelatinization takes place, "Botany Bay Kino" has been used, by which is meant, as I have already shown, any of the kinos belonging to perhaps 40 or 50 species.

I have had over seventy eucalyptus and angophora kinos in spirit (to make tinctures of B. P. strength), for periods varying from a few days to twelve months, and have drawn the following conclusions:— (1) Tinctures do not gelatinize if made from new kinos. By the word "new" I mean under one or two years old. (2) No kinos gelatinize other than the clear ruby ones. Five very old ruby kinos on which I experimented gelatinized in a month or two, (3) All kinos entirely soluble in spirit are ruby ones.

Whatever the cause of gelatinization may be, or rather, whatever the substance may be which, when formed, causes gelatinization, my experiments show that no chemist need have gelatinized tincture of kino if he chooses to avoid it. Old ruby kinos should be rejected for the purpose of tincture making. In the case of a member of the Ruby group, if the kino is not completely and readily soluble in cold water, forming a clear ruby solution, with no gelatinous ruby-colored residue of phlobaphene, it should be rejected. My tinctures were made in March, 1888, and perhaps sufficient time has not elapsed to justify one in being dogmatic on the matter, but I will engage to report these samples in another year or two.

The writer has little doubt that this gelatinous looking mass consists wholly or mainly of softened phlobaphenes. By direct experiment he has shown that insoluble phlobaphenes break down after a longer or shorter period of digestion in alcohol, and form the substance already likened to red-currant jelly. The subject will bear further inquiry, but certainly he cannot detect gum, or the somewhat unsatisfactory pectin in the gelatinized mass.—*Phar. Jour. and Trans.*, October 26, 1889.

¹Cf. *Pharm. Journ.*, i, 399; [3], x, 232.

MINUTES OF THE PHARMACEUTICAL MEETING.

PHILADELPHIA, November 19th, 1889.

The meeting was called to order and Mr. W. B. Webb asked to preside. On motion the reading of the minutes was dispensed with.

The registrar exhibited a *pipette* designed so as to prevent the mixing of liquids which were to be brought together in testing; the line of union of the two liquids could then be distinctly seen by the color occurring at the point of contact. The end of the pipette was curved to a horizontal line so the flow would take place over and not through the lower liquid.

A paper upon *tar* by Mr. R. G. Dunwody, of the present class, was read by him and referred. During the discussion the difference noticed between the tar obtained direct from North Carolina and that refined here for the use of the drug trade was attempted to be accounted for; that tar has a peculiar granular character has long been known and it is nowhere better shown than in *tar ointment*; Mr. J. W. England said, as made by the officinal process of equal parts of tar and suet it inevitably passed into that condition. He found an excellent preventive of that change in the addition of 12.5 per cent. of yellow wax, reducing the suet to 37.5 per cent. In detail the pharmacopœia process was followed. Mr. Webb corroborated this statement and said he used wax in the proportion of 8.5 per cent. with satisfaction. Mr. McIntyre asked why the commercial tar should be refined, that as formerly supplied it was satisfactory; it was stated that Mr. Good thought it necessary because sticks, chips, sand and clay were often found in it. The result seems to be that refined tar is not as desirable as the old-fashioned article was. This, Professor Trimble thought, was owing to the process destroying the pyrocatechin and abietinic acid which are components of true tar. Gas or coal tar if added to tar would, it was thought, destroy both these compounds. It was asked if pyroligneous acid would not also destroy these principles. Professor Trimble thought it would. Dr. Lowe said that Mr. Good's statement that coal tar was not added to that he refined was sufficient, and further he thought coal tar more valuable than wood tar, therefore it would not be used as an adulterant.

Mr. G. M. Beringer read a paper upon the *oleates*, tracing their medical history and giving formulas for the preparation of oleates of zinc, lead, copper, mercury and bismuth. The chairman expressed his gratification with the paper; it was characterized by so much painstaking work. Mr. Boring moved a vote of thanks to the author, and said that he regarded the paper as valuable to all who wished to work in the same line. The chairman inquired if the use of oleates was as large as formerly. Several stated they had seen great advantage from their employment. Mr. Brown said they used a good deal in Cooper Hospital, Camden, N. J.

Professor Maisch asked what was the source of the oleic acid used in these experiments, and referring to the instability of oleates of mercury as ordinarily prepared, suggested that this might possibly be due to the oleic acid used being of vegetable origin, which, according to recent investigations, would always contain some linoleic acid, a compound very prone to oxidize. Mr. Beringer said that the red oil of the candle-makers, purified, had been used; that the iodine number of linoleic acid was very high, and that from this test

he judged that the acid was from animal sources, but he could not speak positively.

Some samples of *saffron* were brought to the attention of the meeting, and in a paper read by Mr. Beringer one sample was described as being adulterated with a kind of grass, stained with some coloring-matter, most probably a coal oil color, and weighted with sulphate of calcium, and the other sample to be adulterated with sulphate of sodium. Professor Maisch said these examinations showed that those who followed the trade of adulterating this drug were choosing new substances for sophistication; that while the inorganic salts could be detected by incinerating the drug and testing the ash, if ammonia salts should be used they would be volatilized and therefore not so easily detected. Professor Maisch went on to say that he thought if the dealers who purchased it at first hands from the producers were willing to pay a sufficient price the true saffron could be had without difficulty; that the saffron produced for home use only in Pennsylvania in Lancaster and Lebanon counties is equal to any and that any surplus not needed by the producers was sold for its weight in silver.

Mr. Isaac Cohen, one of our graduates, presented to the meeting some samples of *extract of beef* prepared by Armour & Co., of Chicago. Their claim is that it contains all the albuminoids of beef with the nutrient properties unimpaired, that no chemicals are added, save a portion of chloride of sodium, to render it permanent. Professor Trimble inquired whether the extract was soluble in wine so as to be suitable for making the beef, wine and iron of pharmacy. The reply was that it was suitable for that purpose if a weak sherry was used; that it had been used in Cincinnati in the hospitals there with satisfaction. Mr. Boring wanted to know if the process was secret, whether the apothecary could make it himself in his store. It was stated in reply that the manufacture was not secret, but that the process was not suitable to the facilities of a drug store, as it needed vacuum apparatus and must be performed on a large scale to be economically done.

Mr. McIntyre inquired if any one could say whether the commercial *pills* requiring *aconite extract* were made with extract of aconite root or leaves. The reply was that the dose generally would indicate which, but in the case of Gross' neuralgic pill, which was mentioned, that the English extract of aconite leaf was used. This query lead to discussion, which showed how it was that aconitine was dismissed from the pharmacopœia, as the crystalline alkaloid was so much stronger than the amorphous, that the doses formerly employed of amorphous aconitine would be positively dangerous if the crystalline alkalo'd were used.

Professor Maisch stated this was also true of digitalin.

The registrar stated that a paper upon the division of powders in prescriptions was published in the August number of the AMERICAN JOURNAL OF PHARMACY, and a tile was described for facilitating the work. Mr. J. S. Mack, of Slatington, a member of the present class, made a couple of them of slate, with the divisions and figures enamelled on them; these tiles were exhibited to the meeting.

On motion adjourned.

THOS. S. WIEGAND,
Registrar.

EDITORIAL DEPARTMENT.

Commercial Interests.—The Secretary of the Section of Commercial Interests of the American Pharmaceutical Association has announced that the Executive Committee of the Section desires to receive copies of all reports relating on matters of commercial interests, which may have been made to either State or local pharmaceutical associations. Correspondence on these topics should be addressed to F. B. Kilmer, New Brunswick, N. J.

Montreal College of Pharmacy.—From a circular issued by the executive officers of the college we learn that by the laws of the Province of Quebec all licentiates in pharmacy must, before obtaining their licenses, take five courses of lectures, two each on materia medica and chemistry, and one on botany. These laws, passed fourteen years ago, compelled the establishment of the Montreal College of Pharmacy, as none of the medical colleges could furnish the required courses. The college has been kept going by aid from time to time from the city trade, both wholesale and retail, and, as its fee for entrance was a nominal one of two dollars, and the professors were paid directly by the students, it had no chance to extend its sphere of usefulness, but had to be content merely to enable its students to comply with the laws. Since its foundation, over 120 licentiates have graduated, many of whom are scattered over this continent doing good work for pharmacy, and it has at present 60 students on the roll.

The college, aiming to keep abreast with the age, finds its main need to be a proper home, and to meet this, the Board have been actively working, with the result that negotiations are being held for the purchase of a well-situated property on St. Catharine street, which can be readily adapted to college purposes. The sum of \$10,000 is required to purchase this, and make needful alterations. Proper and modern equipments are also wanted in the laboratories, class rooms and library, to aid the students successfully to master the daily widening field of studies in connection with their profession. Committees have been canvassing the Montreal pharmacists, and have met with so much success, over \$3,500 being promised, that the Board feel encouraged to persevere in their efforts to give the Montreal College of Pharmacy a home of its own. Subscriptions will be thankfully received, and can be sent to Mr. A. Manson, Treasurer, 37 Recollet street, who is authorized to receive them.

Early Closing.—Under the stimulus of sharp competition a number of pharmacists in our larger cities have found it necessary and profitable to keep their places of business open day and night. In the majority of these stores it is probably not so much a strictly pharmaceutical business, but rather the sale of accessories which are generally kept on hand, that enable this extension of business hours to be carried on without pecuniary loss, or even with actual profit. The curtailing of business hours by early closing in the evening, and limiting the Sunday labor to stated hours, which measures have been frequently agitated in past years, has, in the main, been unsuccessful in our large cities. It will be of interest to learn that in the city of Stuttgart, Germany, which, in 1885, had 126,000 inhabitants, all the pharmacies are closed at nine o'clock in the evening since October 1st. As a matter of course, provision has been made for proper night service; but thus far the experience has been that between the

hours of nine and ten the services of the night clerks have been very rarely required, the public generally approving of the earlier closing.

The Louisville Medical Herald has a "Pharmaceutical Department" which has been in charge of and ably conducted by Mr. J. W. Fowler, who now announces that his other duties have been augmented by one of such paramount importance as to compel him to relinquish the editorial chair. The retiring editor has done good work while in charge of the publication indicated, and we trust that, though retiring from editorial labors, he may still find time and occasion for giving the influence of his pen to the cause of pharmacy.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

The Practice of Pharmacy. A treatise on the modes of making and dispensing officinal, unofficinal and extemporaneous preparations, with descriptions of their properties, uses and doses; intended as a hand-book for pharmacists and physicians and a text book for students. Second edition; enlarged and thoroughly revised. By Joseph P. Remington, Ph.M., F.C.S., Professor of Theory and Practice of Pharmacy, and Director of the Pharmaceutical Laboratory in the Philadelphia College of Pharmacy. With over six hundred illustrations. Philadelphia: J. B. Lippincott Company, 1889. 8vo, pp. 1,300. Price in cloth, \$6.00.

We are pleased to announce the publication of the second edition of this work, which makes its appearance four years after the first edition was noticed in this journal. The value of the work was then pointed out, and what was then said about it remains good also for the present edition, which in its general plan and arrangement remains unaltered, but as compared with the former has been increased in size by 220 pages, ten of which belong to the excellent index. The cause of this large increase is pointed out in the preface and is due to the appending to each chapter of a series of questions on the subjects treated of in the chapter, and is intended for the student's self examination; to the insertion, after the chapter on metrology, of typical pharmaceutical problems and exercises in alligation; to the numerous additions made in Part V, on "Magistral Pharmacy;" and to the incorporation, in Part VI, of the formulas of the National Formulary, and of others that appeared to be desirable. The former of these are distinguished from the others by the affix N. F. and by the numbers assigned to them in this publication; but they are arranged with the other formulas under the heads of their chief or characteristic constituents. A very interesting subject for study and reflection is presented by the autograph prescriptions illustrated by one hundred fac similes, the originals of which appear to have been collected from different parts of the country, and selected for some commendable, erroneous or doubtful qualities. These prescriptions and the accompanying text have been printed upon enameled paper in order to preserve the characteristics of the writing.

In its new garb the "Practice of Pharmacy" will prove as useful as heretofore, and in addition to its former will secure many new friends.

Proceedings of State Pharmaceutical Associations.

The following printed Proceedings have been received:

Iowa.—Tenth annual meeting, pp. 96.—See page 537.

New Jersey.—Nineteenth annual meeting, pp. 113.—See page 318.

New York.—Eleventh annual meeting, pp. 216.—See page 538.

Texas.—Tenth annual meeting, pp. 47.—See page 580.

Wandtafeln zur Mikroskopie der Nahrungs- und Genussmittel aus dem Pflanzenreiche.
Von Docent Dr. Josef Nevinny, Assistent der Lehrkanzel für Pharmakologie
und Pharmakognosie an der Wiener Universität. Gezeichnet von Dr. C. Hen-
ning. I. Lieferung. Wien: Alfred Hölder. 1889.

Charts on the microscopy of the articles of nourishment and food derived from the vegetable kingdom.

This is the first instalment of a work intended to illustrate the structural characteristics of such vegetable substances, which are used as food, or are employed for the adulteration of the same. The size of the charts being 59x86 centimeters, they afford ample room for the illustration of the important anatomical elements of each article of such a size as to be useful for class instruction. Many of the articles selected for illustration are medicinally employed, like taraxacum, ginger, cinnamon, cloves, pepper, capsicum, figs, staranise, flaxseed, almonds, nutmeg, mustard, ergot, etc.; the remainder are important articles of consumption, like tea, coffee, cacao, the cereals, beans, peas, etc., or like some of the drugs named above, or like date seeds, palm kernels, etc., are employed for the adulteration of spices or food. Examinations of articles of daily use by means of the microscope, with the view of establishing their identity and purity, are regarded as important adjuncts of chemical investigations for the objects stated; in fact microscopical researches are continually being extended in most lines of research, and microscopy, as such, is fast occupying the ground for becoming a distinct discipline of a scientific or liberal education. The work, a portion of which is now before us, is intended—in part at least—to further this evolution in one branch of research. The author, who is assistant to the chair of pharmacology and pharmacognosy at the University of Vienna, has selected the material, with good judgment, from preparations made by himself, and the drawings have been accurately and artistically made by Dr. Henning. The four charts now before us leave nothing to desire in regard to the objects in view. The parts containing four such charts, and costing eight marks each, will be issued at intervals, so that the entire work, which, for the present, is limited to sixty such plates, will be in the hands of subscribers in about two years, when it is contemplated to publish, as accompanying text, a hand-book on the same subject. To judge from the first part now before us, the work deserves the attention of the teachers on microscopy and of pharmacognosy, and of all those who are interested in the examination of food by means of the microscope.

Foods and Food Adulterants.—Investigations made under direction of Dr. H. W. Wiley, Chief Chemist. Part V. Baking powders. By C. A. Crampton, Analytical Chemist. Pp. 560-628.

Issued as a part of Bulletin 13 of the U. S. Department of Agriculture, Division of Chemistry, the pamphlet has accomplished a very good result in showing the inferior quality of some of the commercial baking powders. A formula is given for a baking powder of a better than the average quality and which can

be readily prepared at a moderate cost; the proportions are cream of tartar 8, baking soda 4, and corn starch 4 parts.

Record of Experiments at Sugar Experiment Stations. Bulletins 22 and 23, U. S. Department of Agriculture, Division of Chemistry.

The former of these pamphlets refers to the Des Lignes station at Baldwin, La., and the latter to Calumet Plantation at Pattersonville, La.

Composition of Sorghum Seed with reference to its feeding value.

Influence of Food, Animal Idiosyncrasy and Breed on the Composition of Butter.

Two pamphlets containing papers read before the Society for the Promotion of Agricultural Science at its tenth meeting in Toronto in August last, by H. W. Wiley, Chief Chemist of the Department of Agriculture.

Proceedings of the Sixth Annual Convention of the National Confectioners' Association of the United States. Philadelphia: Confectioners' Journal Print, 1889. 12mo, pp. 143.

The convention was held in New York, commencing July 9, 1889.

OBITUARY.

Edward B. Garrigues, the last survivor of the original members of the Philadelphia College of Pharmacy, died in this city November 3d, in the ninety-fifth year of his age. He was the father of Dr. Samuel S. Garrigues, whose death was announced in our June number. During the early history of the College he took an active interest in its affairs, rendering services on committees and as an officer of the institution. A sketch of his life is being prepared by the committee on deceased members, and will appear in a future issue.

Reinhold F. W. Rother, prominent as a writer on pharmaceutical subjects, died in Detroit, October 18, 1889, a disease of the brain being the immediate cause of his death. He was born in Landau, Silesia, in 1843, and at the age of six years came to America, his parents settling in Monroe, Mich., where Reinhold was educated, graduating from the High School. He learned the drug business at Ann Arbor, graduated in 1867 as pharmaceutical chemist from the University of Michigan, and afterward clerked in Chicago, remaining with Mr. A. E. Ebert for about eight years, during which time he wrote numerous papers for the Chicago "Pharmacist." Later on his prolific pen contributed also many papers to this and to other pharmaceutical journals. Since 1876 he was in business in Detroit, until a few years ago failing health compelled him to relinquish business. His writings, including the two works, "Beginnings in Pharmacy" and "Chemistry of Pharmacy," noticed in these pages somewhat over a year ago, are characterized by philosophical reasonings, and though often somewhat cumbersome in style, bore the stamp of scientific training, close observation, and original thought, as a rule directed to practical application. His love for, and interest in, scientific research was not confined to his writings, but was manifested also in various other ways. Thus, about five years ago he donated to the Philadelphia College of Pharmacy the sum of \$500 to be applied to original chemical research, which was done with his

advice and consent, and to the Chicago College of Pharmacy he conveyed some real estate which at the present time is valued at about \$10,000. Mr. Rother was not married; his mother survives him.

Frederick A. Tilge, Ph. G., died in Germantown, Philadelphia, November 10, 1889, of pneumonia, aged 47 years. He was born in this city, learned the drug business with the firm of Fred. Brown, graduated in 1863, and then started in business with his brother George as importers of druggists' sundries. A few years ago he connected himself with the firm of Henry Tilge & Co., hatters, the senior member being his father, who died four days before the son.

Joseph Wiley, Ph. G., was killed by the explosion of "flash powder" at his place of business on North Seventh street, Philadelphia, November 11th, 1889. He learned the drug business with the firm of W. R. Warner & Co., of whose manufacturing department he had been in charge for some time. He graduated from the Philadelphia College of Pharmacy in 1872, afterwards was in business as a pharmacist, and for about eight years as a wholesale druggist and manufacturer, the firm name being finally Wiley & Wallace. Several accidents having occurred through the explosion of "flash powder"—a combination of powdered magnesium with oxidizing agents, Mr. Wiley was engaged in making preparations for removing from the premises the last portions of the explosive stock, when the same exploded, instantly killing him and his two assistants.

Chas. Wesley Rinedoller, Ph. G., a native of Philadelphia, was an apprentice in the store of Dr. C. G. Frowert, graduated in pharmacy in 1887, and subsequently had charge of the chemical manufacturing department of the firm of Wiley & Wallace, when he was killed by the explosion mentioned before.

Rudolph Littmann, the third victim of this explosion, was a student of the Philadelphia College of Pharmacy, and had attended the lectures and examinations up to Saturday preceding his death. At a meeting of the class his fellow-students passed the following resolutions:

Whereas it has pleased the All-wise Providence to remove from our midst, by a most distressing casualty, Rudolph Littmann, one of the members of the Junior Class of 1889 and '90 of the Philadelphia College of Pharmacy; it is therefore,

Resolved, by his Classmates, That in bowing to the will of the Almighty, we recognize the affliction that has befallen us, and tender to his family and friends our heartfelt sympathy.

Resolved, That a copy of these resolutions be engrossed and sent to the family of our deceased Classmate, and that they be published in the *AMERICAN JOURNAL OF PHARMACY* and daily papers.

CLARENCE W. ELSTON,
EDWARD T. N. STEIN,
C. E. KITCHEN,
C. EUGENE LACK,
W. O. BRICE,

Committee.

INDEX

TO VOL. LXI (VOL. XIX, FOURTH SERIES), OF THE
AMERICAN JOURNAL OF PHARMACY.

Abrus precatorius, toxic action of proteids	625
Absinthe, composition and effects of.....	612
Acacia arabica, fruit, use in Egypt.....	189
Academy of Sciences (Royal) at Turin.....	224
Acetanilid, distinctive tests for	506
in phenacetin	77, 134
in topical preparations.....	458
use in throat diseases.....	515
Acetone, detection in urine.....	175
in methyl alcohol.....	76
manufacture of	323
Acetphenylhydrazid, compared with pyrodine.....	131
named hydracetin (see also pyrodine)	354
Acetyl chloride, action on phenol ethers.....	498
Acid, acetic, as an antiseptic.....	83
glacial, strength of.....	335
agaric, formulas, properties, etc.....	253
benzoic, distinction from vanillin.....	20
synthetical, detection of.....	562
boric, plasters containing.....	416
carbolic, color reaction (amyl nitrite)	566
for removal of warts (see also phenol).....	85
synthetic, properties of	563
test to distinguish from resorcin.....	468
chelidonic, derivatives of.....	548
chromic, use in excessive sweating.....	104
cocaic, preparation and properties	298
cocrylic, preparation and composition.....	300
diamido-benzoic, action of sodium hypobromite	19
dithio salicylic, formula and preparation.....	411
filicic, activity of	170
composition and derivatives	145
preparation and properties.....	21
gallic, examination of commercial.....	9
new tests (Ranson).....	181
hippuric reaction with sodium hypobromite.....	19
humic, properties of.....	310
hydrochloric, estimation in contents of stomach.....	251
hydrocyanic, commercial, strength of.....	536
in preparations of wild cherry bark.....	534
hypogaeic, product of oxidation of.....	471
hypophosphorous, commercial, examination of.....	459
methods of estimation.....	326, 386, 459
preparation of.....	462
isatropic, preparation and properties of.....	35
isoarabinic, preparation from tartaric acid.....	490
lactic, use in diarrhoea.....	183
use in tuberculous diarrhoea.....	314
lactobionic, preparation and properties of.....	425
linoleic, product of oxidation of.....	471
morrhucic, properties of.....	138
nitric, test for (resorcin).....	566
nitrous, Griess' test for.....	94

Acid, nitrous, test for (apomorphine).....	470
test for (resorcin).....	566
oleic, adulterations.....	244
commercial, detection of presence of linoleic acid.....	356
falsification of linoleic acid.....	475
product of oxidation of.....	471, 620
specific gravity of.....	595
persulphuric, formation of hydrogen peroxide from.....	620
phenylpropionic, use in phthisis.....	397
polydissolvent, preparation of.....	413
pyrogallie, see Pyrogallol.	
quillajic, preparation, properties, etc.....	142
salicylic, distinction from carbolic acid.....	177
examination for homologous acids.....	353
plasters containing.....	416
test to distinguish from resorcin.....	468
salicyl-sulphonic, test for albumen.....	562
sulphanilic, test for nitrous acid.....	94
sulpholeinic, preparation.....	413
tannic, new tests (Rawson).....	181
solubility in different solvents.....	534
use of, in burns.....	561, 608
tartaric, reduction of.....	490
ulmic, properties of.....	310
Acids, diffusion of, with bases.....	615
of gastric and intestinal juices, recognition of.....	25
Aconite, cultivation in Cambridgeshire.....	510
menstruum for extracting.....	536
Aconkathera Ouabaio, glucoside from.....	84, 469
Adeps benzoatus, preparation.....	246
Adulterations, report on.....	335
Albany College of Pharmacy.....	263
Albizzia Lebbek cultivated in Egypt.....	189
Albumen, test for (salicyl-sulphonic acid).....	562
Albumin in urine, densimetric estimation.....	24
Alcohol, dietetic action of.....	622
methyl, see Methyl alcohol.	
Alkaloids, borates of, collyria.....	244
reactions with fluoniobate reagent.....	19
synthesis of.....	545
Aluminium acetate, properties.....	125
oleate as basis of plasters.....	416
American Medical Association.....	223
committee of conference with pharmacists.....	492
Pharmaceutical Association, San Francisco meeting.....	51, 107, 160, 223, 259, 264, 434
section on commercial interests.....	636
<i>Amerman Ella</i> . Chamomile flowers.....	69
Ammonia, diffusion of, with acids.....	615
household, strength of.....	335
water, specific gravities of.....	516
carbonate, titration of.....	500
Ammonium, iodide, method of decolorization.....	464
molybdate, test for hypophosphites.....	129
Amyl alcohol, contamination with furfural.....	133
separation from fusel oil.....	150
nitrite, a mixture of two compounds.....	148
chemical constituents.....	153
Amylene hydrate, action of.....	285
Anatomical specimens, colored, preservation of.....	245
<i>Anderson, F. W.</i> Poisonous plants and the symptoms they produce.....	408

<i>André, G.</i> Mercurammonium chlorides.....	519
Andromedotoxin, process of isolation.....	360
Aniline, action of sodium hypobromite.....	19
Animal organism, synthetical processes of.....	197
Anisol, action of acetyl chloride on.....	498
action of benzoyl chloride on.....	499
Annidalin, substitute for iodoform.....	609
Anthemis nobilis, constituents of flowers.....	69
Anthraxobin, plasters containing.....	416
Antifebrin, see Acetanilid.	
Antifungin, composition and use of.....	131
Antimony, volumetric estimation in tartar emetic.....	28
Antipyrin, action of, on the teeth.....	105
dry, incompatibility with salicylate of sodium.....	288
increased solubility of quinine salts by.....	291
reaction with ferric chloride.....	442
use as an antigalactic.....	509
use for relieving pain of cancer.....	314
Antiseptics, incompatible.....	104
Apomorphine, acetate, color reaction of.....	131
hydrochlorate, remedy for coughs.....	23
oxalate, color reaction of.....	131
reaction with fluoniobate.....	19
test for nitrous acid and nitrites.....	470
use of, in coughs.....	104
Apple of Peru, in the Southern States.....	554
Aqua chloroformi, properties.....	68
sinapis, preparation.....	127
Arachis hypogaea, cultivation in China.....	143
use in Egypt.....	189
Archiv der Pharmacie, editorial change.....	588
Areca nut, alkaloids from.....	133, 190
Arecaïne, properties of.....	133, 192
Arecoline, physiological action of.....	193
preparation.....	191
properties.....	133, 191
salts of.....	192
<i>Armand</i> Arrow-poison of the Somalis.....	84
Strophantin.....	85
Arrack, preparation from cassava.....	80
Arrow-poison of the Somalis (ouabaio).....	84
Arsenic, presence of, in glycerin.....	176, 531
in wall paper.....	438
test for (Gutzeit).....	133
Gutzeit's improved (Ritsert).....	414
<i>Arthur, Chas.</i> Glycerites of ferrous salts.....	367
Asafetida, quality of commercial.....	315
Asclepias Cornuti, analysis (Quackenbush).....	113
tuberosa, crystalline constituents of.....	114
Ash determinations, with silver or platinum.....	77
Aspidium Filix mas, constituents (Dacomo).....	144
oleoresin, dose of.....	203
Aspidol from male fern.....	144
Assaying, pharmaceutical (Drescher).....	337
Atropine, constitution of.....	547
Ball, A. Suggestions for the use of lanolin in pharmacy.....	418
<i>Ballo, M.</i> Reduction of tartaric acid.....	490
Balsam of sulphur, preparation of fragrant.....	22
tolu, process for emulsionizing.....	559
Balsamodendron Berryi, gum resin from.....	508

Balsams, chemical examination (<i>Dieterich</i>).....	357
Barium bromate, preparation of.....	119
Bases, diffusion of, with acids.....	615
Bay rum, formula for.....	312
<i>Bear, J. H.</i> Syrupus rhei aromaticus.....	128
<i>Beauvais, Jos.</i> Anatomical structure of <i>Grindelia robusta</i>	82
<i>Beckwith, J. W.</i> Fluid extract of <i>apocynum</i>	127
Beef, scraped, preparation of palatable.....	473
Beef-fat, detection of in lard.....	195
iodine number.....	197
Beer, presence of picrotoxin in.....	443
Belladonna, cultivation in Cambridgeshire.....	511
menstruum for extracting.....	536
southern representative of.....	553
root, alkaloidal strength, variation of.....	440
powdered, assay of.....	335
Benzamide, action of sodium hypobromite.....	19
Benzonitril, action of sodium hypobromite.....	19
Benzoyl chloride, action on phenol ethers.....	499
<i>Beringer, G. M.</i> Adulteration of ground flaxseed.....	167
Adulterated Spanish saffron.....	607, 635
Expressed oil of almonds.....	230
Note on loco weeds.....	408
Notes from various journals.....	468
Oleates.....	593, 634
The Hungarian daisy as an adulterant of insect powder.....	1
Tincture of <i>strophæanthus</i>	454
Titration of ammonium carbonate.....	500
<i>Berthelot, Mr.</i> Action of acids on thiosulphates.....	524
Betaines, analogous compounds.....	548
Bismuth, reaction with cinchonine and potassium iodide.....	82
oleate, preparation of.....	599
oxidide, comparison of processes.....	161, 236
Bitter root (<i>Lewisia</i>), use and constituents of.....	4
Blackberry bark, analysis of (<i>Kraus</i>).....	605
brandy, formulas and examination of commercial.....	467
Blue, Prussian, preparation of soluble.....	429
Bone fat, iodine number.....	197
<i>Boole, Miss L. E. and Prof. Dunstan.</i> Chemical observations on tartar emetic	27
Bor ice, preparation and use.....	178
Boroglycerides, preparation and properties.....	130
Boron, preparation of, from borax.....	602
trichloride, preparation of (<i>Maisch</i>).....	603
<i>Burget, Dr.</i> Chemical changes in the gastric juice.....	572
<i>Bourquelot, E.</i> Keratin and keratinized pills.....	421
<i>Bowers, C. E.</i> Oil of maize.....	503
<i>Bowman, D. B.</i> Unguentum hydrargyri.....	466
British Pharmaceutical Conference.....	526
Brou, injection, formula.....	80
<i>Brown, A. P.</i> New medium for mounting starches and pollens.....	171
Oleate of mercury.....	168
Brucine acetate, color reaction of.....	131
derivatives from.....	549
quantitative separation from strychnine.....	180
reaction with chlorine.....	19
<i>Buckingham, J. H.</i> Modified formula for Brown mixture.....	75
Buffalo College of Pharmacy.....	263
Burns, application for, cocaine.....	137
tannin.....	561, 608
<i>Butterfield, F. V.</i> Photography.....	45, 99, 155, 199
Butyl chloride, administration of.....	473

Cacao, ratafia of, directions for making.....	90
Caffeine, granular salts, commercial, examination of.....	9
phenate, preparation, action and dose.....	288
and benzoate of sodium, incompatibility with acid fruit syrups.....	288
Calcium boroglyceride, preparation.....	130
hypophosphite, determination of purity (Moerk).....	391
strophanthate, effects and properties of.....	287
Calendula officinalis, cultivated in gardens.....	554
Calophyllum Inophyllum, oil of seed.....	87
Calumba, southern representative of.....	553
Calvert, John. Chinese extract of opium.....	440
Camphor liquefied by phenols.....	136
Canaille, as a tanning material.....	395
Cannon, C. W. Bases for unguentum iodi.....	128
Cantharides, determination of cantharidin.....	21
Cantharidin, uses of, in pharmacy.....	439
Caoutchouc, see Rubber.	
Capparis Sodada, use of root in Egypt.....	188
Capsaicin, source and isolation.....	179
Carbohydrates, presence in urine.....	20
Carbon disulphide, purification of.....	468
Carroll, S. L. Salicylate of cinchonidine.....	124
Carter, Dr. Principle of disinfection in medicine.....	483
Cascara sagrada, see Rhamnus Purshiana.	
Casearia esculenta, medical properties and constituents of.....	536
Cassaday, F. V. Euonymus atropurpureus.....	284
Catarrh cure, analysis of.....	10
Catechu, medicinal, examination and estimation.....	165
Celluloids, phenolated, for surgical use.....	559
Cellulose, colloidal, preparation and properties of.....	568
Cera amyлата, as pill excipient.....	294
Ceratum petrolati, formula (Nicot).....	175
resinae comp., in the pharmacopœia.....	316
Chamælitrium luteum, medical properties and constituents.....	553
Chamomile flowers, constituents of.....	69
Cherry-gum, substitute for gum arabic in emulsions.....	178
Chimaphila umbellata free from andromedotoxin.....	361
Chloral hydrate, action upon glass.....	506
use in night sweats.....	352
Chloralamid or chloral formamid, hypnotic action of.....	523
Chlorates, phenol and orcinol as tests for.....	92
Chlorine in sulphuric acid, reactions of certain alkaloids.....	19
vapor-density of.....	95
Chloroform, benzoated, preparation and uses of.....	105
manufacture of, from acetone.....	223, 321
Chlorophyll, coloring principles of (Hansen).....	561
Chocolate, purgative, preparation of.....	472
Chrysanthemum cinerariæfolium, description of flower.....	3, 295
Chrysarobin, plasters containing.....	416
Cinchona alkaloids, bromates of.....	119
Cinchonidine bromate, preparation and properties of.....	120
salicylate, preparation.....	124
Cinchonine bromate, preparation and properties of.....	121
derivative from.....	549
Cincinnati College of Pharmacy.....	221
Cineol, present in volatile oils.....	371
Cinnamomum Kiamis, bark, description of.....	38
xanthoneuron, bark, description of.....	37
Classen, Edo. On filters.....	74, 159
Clethra alnifolia and arborea free from andromedotoxin.....	361
Cloves, artificial, composition and detection.....	411

Cobalt, elementary nature of (Fleitmann)	430
new metal in, and redetermination of atomic weight.....	132
Coca, cultivation in the East Indies.....	580
bases, chemistry of (Hesse).....	296
leaves, assay of (V. d. Marck)	294
East Indian, assays of.....	358
varieties in the market	297
Cocaine, alkaloids occurring with.....	296, 433
color reaction with resorcin.....	470
impure, reaction with resorcin on.....	507
reaction of, with borax	18, 254
synthesis of	549
tests for (Greitherr)	563
toxic effects	81
use of, with lanolin, for burns	137
Cocamine, physiologic. action of.....	299
preparation and properties.....	297
Cocamylegonine from coca leaves.....	298
Cocanut as a taenicide.....	487
Cocrylegonine and cocrylamine from coca leaves.....	300
Codeine, synthetical preparation of.....	135
Coffee, effect on the urine.....	141
Colchicine, use in certain eye affections.....	283
Collodium, preparation of clear.....	415
Collutorium sinapi, formula.....	126
Collyria of alkaloid borates.....	244
Congress, International medical in 1890.....	540
of hydrology and climatology in 1889.....	383
of therapeutics and materia medica in 1889.....	383
pharmaceutical in 1890	493
Conine, synthesis of.....	546
Conroy, M. Linimentum opii ammoniatum.....	98
Contrayerva root, white, origin of.....	351
Copaiba, adulterations present in.....	336
Copper oleate, preparation of.....	597
salts, reaction with potassium bromide.....	289
Coronilla scorpioides, properties of bitter principle.....	81
Coumarin, list of plants containing.....	375
Crafts, J. M. and C. Friedel. Vapor density of chlorine and ferric chloride..	95
Creasote, administration of, with cod liver oil.....	428, 559
distinguished from guaiacol.....	470
plasters containing.....	416
tests for purity of.....	176
use in phthisis.....	314
use of, for hiccough.....	587
Creolin, constituents of.....	176
Jeyes', contains resin soap.....	294
Cresols, salicylates, preparation and properties of.....	243
Cubebs, immature, description of.....	117
Culin, W. Tinctura ferri chloridi.....	123
Cupreine, preparation and salts of.....	573
Dacomo, G. Aspidium Filix mas.....	144
Daisy, Hungarian, an adulterant of insect powder.....	1, 50
structural characteristics of.....	295
Dallas Pharmaceutical Association.....	222
Dammar, composition of.....	176
Davies, R. H. Iodine absorption equivalents of essential oils.....	301
Death camas of Indians, Zygadenus venenosus.....	410
Deitz, Geo. A. Fabiana imbricata.....	405
Dentifrice, see Toothpowder and Toothwash.	

Dextrin, substitute for gum arabic.....	469
<i>DeZaayer, H. G. and P. C. Plugge.</i> Andromedotoxin.....	360
Diamine metaphenylene hydrochlorate, action of sodium hypobromite....	19
Diamine-tolulene, action of sodium hypobromite.....	19
Diastase, artificial, preparation from wheat gluten.....	432
estimation in malt extract.....	482
Digitalis ambigua, constituents of.....	20
purpurea, cultivation in Cambridgeshire.....	512
influence of heat on toxic power.....	174
Diosmin, preparation and chemistry of.....	86
Diospyros virginiana, bark, constituents.....	69
Diphenyl methylpyrazol, preparation and properties.....	20
Disinfection in medicine, principle of.....	483
<i>Drescher, A.</i> On pharmaceutical assaying.....	337
Dressings, beta-naphthol, formulas.....	289
phenolated pyroxylin.....	559
Drug exhaustion, effect of moisture on.....	438
sections, preparation for microscopical examination.....	42
Drugstores, early closing of.....	636
<i>Dunstan, Prof. and E. J. Woolley.</i> Chemical constituents of amyl nitrite... 153	
<i>L. E. Boole.</i> Chemical observations on tartar emetic.....	27
<i>W. L. Williams.</i> Metamerie amyl nitrites.....	148
<i>Dunwoody, R. G.</i> Commercial tar.....	600, 634
Eads, R. I. Iodides of mercury.....	123
<i>Einhorn, A.</i> Alkaloids occurring with cocaine.....	493
<i>Eldredge, C. S.</i> Lime water.....	336
Electrode indicator, preparation of.....	131
Elm, slippery, adulteration of ground bark.....	261
Emulsion of petrolatum, preparation of.....	559
of tolu balsam, preparation of.....	559
Emulsions, preparation with mucilage of acacia and sugar.....	291
Enemeta of hyponne, chloral and sulphonal (<i>Vigier</i>).....	416
<i>England, Jos. W.</i> Infusion of digitalis.....	341
Permanent syrup of hydriodic acid.....	14
Tincture of mustard.....	124
Eriodictyon californicum, analysis of leaves.....	70
Ergosterin, preparation and properties of.....	173
Erythroxyton Coca, see Coca.	
Eschscholtzia californica, constituents of.....	18
Eucalyptol present in volatile oils.....	371
Eucalyptus, species yielding kino.....	627
Euonymus atropurpureus, analysis of root bark (<i>Cassaday</i>).....	284
constituents of root bark (<i>Naylor and Chaplin</i>).....	530
Exalgin, characteristic differences from strychnine.....	417
effect compared to antipyrine.....	243
Exposition, Universal, at Paris.....	52
Extract aconite, assay of (<i>van Itallie</i>).....	134
beef, containing the albuminoids.....	635
belladonna, assay of (<i>van Itallie</i>).....	134
conium, assay of (<i>van Itallie</i>).....	134
glycyrrhiza, test of purity.....	248
hyoscyamus, assay of (<i>van Itallie</i>).....	134
opium, Chinese method of preparing.....	440
malt, estimation of diastase.....	482
psoralea melilotoides, preparation.....	351
rhamnus purshiana, recovery of alcohol.....	184
tasteless, not active.....	185
stramonium seed, preparation of.....	527
valerian, loss of volatile oil in preparing.....	417
fluid, apocynum, experiments with different menstrooms.....	127

Extract fluid, psoralea melilotoides, preparation.....	351
rhamnus purshiana, modified process.....	184
viburnum, remedy for vomiting of pregnancy	128
Extracts, narcotic, assay of	134
use of cold in preparation.....	242
fluid, manufacture by retail pharmacists	51
Fabiana imbricata , crystalline principle in	407
habitat, analysis, etc	405
Falk, J. C. Iodide of ammonium	464
Fat , synthesis in animal economy.....	198
Fats , animal and vegetable, distinction of	507
Ferri et ammonii citras , manipulation in preparing.....	527
Ferric albuminate , with sodium citrate, preparation.....	292
chloride, vapor density of.....	95
hypophosphite, determination of purity (Moerk).....	392
oxychloride solution with sodium citrate, preparation	293
peptonate, with sodium citrate preparation	298
Ferricyanides , action of sodium hypobromite upon.....	19
Ferrocyanides , action of sodium hypobromite upon.....	19
Ferrous iodide incompatible with potassium chlorate.....	79
phospho citrate, crystalline, preparation of	560
salts, glycerites of, preparation.....	367
solutions, preservation by hypophosphorous acid.....	440
Ferrum dialysatum , concentration of by freezing	414
reductum, commercial, quality of.....	335
Filemonowicz, J. and B. Pawlowski. Solubility and estimation of paraffin....	152
Filters , folding of (Claassen).....	74, 159
Fischer, E., and J. Meyer. Oxidation of milk-sugar.....	425
Flannels , mercurial, preparation of.....	611
Flaxseed , amount of oil in	442
ground, adulteration of.....	167, 204
Fleitmann, Dr. On the nature of cobalt and nickel.....	430
Fluorescence , preparations for destruction of.....	132
Foerster, F. and F. Mylius. Solubility of glass in water.....	518
Fokker, Dr. Acid fermentation of milk.....	479
Frangula , southern representative of.....	553
Franklin Institute , award of medals by.....	51
Frasera Walteri , American columbo.....	554
Freezing mixture , containing carbon dioxide.....	177
Friedel, C. and J. M. Crafts. Vapor density of chlorine and ferric chloride	95
Fritillaria pudica a loco weed.....	409
Fromentine (wheat embryo), an alimentary substance.....	361
Fuge, H. D. Note on cascara sagrada.....	184
Furfural present in amyl alcohol.....	133
Gastric juice , acids present in.....	25
chemical changes in.....	572
Gaultheria procumbens free from andromedotoxin.....	361
Gelatoles from castor oil soap.....	443
Gentian , southern representatives of.....	553
Geranium maculatum , constituents of (Mayers).....	238
Gillispie, H. R. <i>Nepeta Cataria</i>	555
Ginger resin , properties of.....	558
Glass , action of chloral hydrate on.....	506
a new optical (phosphates and borates).....	412
solubility in dilute acid.....	527
solubility in water.....	518
Glenk, Rob. Methysticin from <i>Piper methysticum</i>	8
Resin from flowerbuds of <i>Populus tremuloides</i>	240
Resin of ginger.....	558

<i>Glenk, Rob.</i> Sick headache powder.....	142
Glucose, commercial, use in pharmacy.....	439
presence in milk sugar.....	249
volumetric estimation (Causse).....	78
Glue, substitute for gum arabic in emulsions.....	178
Glycerin, action upon vulcanized rubber.....	287
arsenic present in.....	179, 531
iodized, prevention of evaporation of iodine.....	366
tests of purity of.....	23
Glyceritum acidi gallici, crystallization of freshly prepared samples.....	182
ferri bromidi, formula.....	368
iodidi, formula.....	368
Glycol, reaction with sodium hypobromite.....	19
Glycolin, properties of.....	316
Gold bromide, effect and dose of.....	290
chloride as tests for fixed oils.....	23, 65
<i>Gorgeu, A.</i> Manganese oxides and manganous carbonate.....	522
Graduates, cleaning of.....	236
Granules, atropine, preparation of.....	587
of morphine sulphate. assay of.....	336
<i>Granval and Valser.</i> Falsification of oleic acid.....	475
<i>Greenawalt, Wm. G.</i> Oleoresin of male fern.....	169
<i>Greene, Chas. E.</i> Bismuthyl iodide.....	161
Griess' test for nitrous acid.....	94
Grindelia robusta, anatomical structure.....	82
<i>Grosse, G. M.</i> Reduced iron.....	335
Groundnuts, cultivation in China.....	143
use in Egypt.....	189
Guaiacol, properties, reactions of.....	249
test for distinguishing from creasote.....	470
<i>Guignet, C. E.</i> Colloidal cellulose.....	568
Soluble Prussian blue.....	429
Gum-resins, chemical examination of (Dieterich).....	357
Gum soluble in tragacanth.....	72
Gypsophila Struthium yields a soap root.....	188
Hanbury medal, award of.....	492
<i>Handler, W.</i> Simple syrup.....	335
<i>Havard, Dr. V.</i> <i>Lewisia rediviva</i>	4
Peucedanum, species used by the Indians.....	556
Psoralea esculenta.....	346
<i>Heckel, E. and Fr. Schlagdenhauffen.</i> The root of <i>Vernonia nigritiana</i>	40
Helleborein as a local anæsthetic.....	104
<i>Helonias dioica</i> , pharmacopœial recognition of.....	553
Henna, use of, in Egypt.....	189
<i>Henney, S. F.</i> <i>Lycopus virginicus</i>	70
<i>Hesse, O.</i> Chemistry of coca bases.....	296
<i>Hibiscus Sabdariffa</i> , use of calyx.....	204
Hiccough, to remove.....	11
<i>Hill, J. R.</i> American tinctura quillajæ.....	138
<i>Hofmeister, H.</i> On agaric acid.....	253
Hog potato of California, <i>Zygadenus</i>	410
<i>Holmes, E. M.</i> Cultivation of medicinal plants in Cambridgeshire.....	510
Massoi bark.....	37
Honey, eucalyptus, a fraudulent product.....	264
<i>Hooper, David.</i> <i>Balsam dendron Berryi</i>	508
Laurel-nut oil.....	87
<i>Hoppe-Seyler, F.</i> Humous substances.....	309
<i>Hosletter, A. G.</i> Potassium tartrate.....	335
Humous substances, formation of.....	309
Hydracetic, characteristics, dose, etc.....	354

Hydrangin, composition of.....	117, 158
Hydrogen peroxide, formation of, from persulphuric acid.....	620
Hyosine, action of.....	81
Hyosyamus, cultivation in Cambridgeshire.....	511
Hyponitrous oxide, preparation of pure.....	182
Hypophosphites, ammonium molybdate as a test for.....	129
methods of estimation.....	326, 386
Hysterionica Baylahuen, medicinal properties.....	173
Infusum , digitalis, formula for (England).....	341
toxic power reduced by concentration.....	174
gentianæ concentratum, formula for (Johnston).....	535
Injection Brou, formula for.....	80
Ink, marking, substitute for (magnolia leaves).....	8
stains, removal of.....	76
Insect flowers, structural characteristics of.....	295
powder, adulteration with Hungarian daisy.....	1, 50
adult-rated with quillaia.....	177
detection of turmeric in.....	22
Insecticide, preparation of (Kühl).....	355
Intestinal juice, acids contained in.....	25
Iodine, new topical preparation (Symonnet).....	415
phenol, formula and use in whooping cough.....	411
Iodoform, action of solvents on.....	131, 288
behavior with ether.....	20
decomposition of, in solution.....	131, 288
poisoning in children.....	289
preparation from acetone.....	175
substitute for (annidalin).....	609
Ipecacuanha, standardized preparations of.....	529
volatile alkaloid in.....	78
Iron, see Ferric, Ferrous and Ferrum.	
Isobutyl nitrite, preparation of.....	150
presence in amyl nitrite.....	154
Isatropylcocaine, preparation and properties.....	34
Jacobs, O. B. Tinctura gentianæ composita.....	467
Jalap, assay of (Drescher).....	340
Jamaica, calyx of Hibiscus Sabdariaffa.....	204
Jellies, commercial, analysis (Jones).....	12
Jones, L. M. Analysis of market jellies.....	12
Johnson, C. G. Bromates of the cinchona alkaloids.....	119
Juglans regia, characters of oil.....	419
Kansas University , School of Pharmacy.....	376
Kalmia latifolia contains andromedotoxin.....	361
Kavaïne, alkaloid of kava kava.....	136
Kelly, J. P. Blackberry brandy.....	467
Keratin, source, use, etc.....	421
Kino, eucalyptus, history, properties and uses.....	626
examination of commercial.....	70
Kisch, W. and J. König. Examination of commercial peptones.....	525
Kobert, R. Quillajic acid.....	142
König, J. and W. Kisch. Examination of commercial peptones.....	525
Krauss, G. A. Analysis of blackberry bark.....	605
Kraus, G. Physiology of tannin.....	567
Kuder, Wm. Granular salts of caffeine.....	9
Lard , detection of cottonseed oil and beef fat.....	195
iodine number.....	197
Lanolin, historical notes on.....	439
in suppositories.....	80

Lanolin, suggestions for the use of.....	418
Lawsonia leaves, use in Egypt.....	189
Lead oleate, preparation of.....	596
Ledum palustre free from andromedotoxin.....	361
Lemon juice, acid strength of.....	534
Lenhardt, O. F. Eriodictyon californicum.....	70
Lenz, W. Recent processes for testing quinine.....	146
Leucocrinum montanum a loco weed.....	409
Lewisia rediviva, uses and constituents of root.....	4, 49
Liebermann, C. Isatropylcocaine.....	34
Lime, chlorinated, commercial, examination of (Schroeter).....	13, 49
Lindo, D. Phenol and allied substances as tests for nitrates, etc., in aqueous solution.....	90
Linimentum opii ammoniatum, properties of crystals deposited.....	98
Liquidambar orientale, bark, use in Egypt.....	188
Liquor calcis, strength of.....	336
cinchonæ preparation (Rolfs).....	247
Donovan, deterioration of.....	439
ferri chloridi, preparation from different kinds of iron.....	122
dialysatus, concentration by freezing.....	414
magnesiæ citratis, modification of formula (Patch).....	438
morphinæ meconatis, proper strength of.....	536
potassii arsenitis, deterioration of.....	418
Lithium carbonote, test of purity.....	356
salts. effect upon uric acid and urates.....	530
sulphate, solubility in alcohol.....	356
Loco weed, poisonous properties of.....	49
weeds, varieties and effects of.....	408
Louisville College of Pharmacy.....	222, 376
Medical Herald, editorial change.....	637
Lowe, C. B. Immature cubebs.....	117
Refined tar of commerce.....	234
Lovenberg, J. Morphine sulphate.....	336
Lunge, G and T. Wiernik. Specific gravities of ammonia solutions.....	516
Lycopodium virginicus, constituents of.....	70
Lynch, A. J. Assays of milk.....	16
Macon, G. H. Pill excipient for potassium permanganate.....	467
Magnesia, heavy calcined, fraudulent.....	121
Magnesium boroglyceride, preparation.....	130
silicate, use in chronic diarrhœa.....	84
Magnolia glauca, analysis of leaves.....	6
use for marking.....	8
Maiden, J. H. Botany Bay or eucalyptus kino.....	626
The resin of myoporum platycarpum.....	623
Maisch, H. C. C. Action of acid chlorides on phenol ethers.....	497
Contribution to the knowledge of boron.....	602
Maisch, J. M. Note on andromedotoxin in ericacææ.....	361
Note on filicic acid.....	171
Note on use of magnolia leaves.....	8
Notes on some indigenous remedies.....	552
On soluble gum tragacanth.....	72
Origin of false senega root.....	439
Preparations of mustard for internal use.....	126
Useful plants of the genus psoralea.....	345
Mandragorine, alkaloid from mandragora autumnalis.....	355
Manganese carbonate, action of air on.....	523, 619
oxalate, advantage over other compounds for drying oils.....	77
peroxide, reaction with potassium chlorate.....	250
Manganous oxide and salts, behaviour to air, heat and chemicals.....	522
Manihot utilisima, preparation of arrack from.....	80

<i>Martin, Sidney.</i> The toxic action of <i>abrus precatorius</i>	625
<i>Martindale, Wm.</i> Egyptian opium and other drugs	187
Maryland College of Pharmacy.....	221
Massachusetts College of Pharmacy	317
Massoi bark, source of.....	37
<i>Mayers, H. J.</i> <i>Geranium maculatum</i>	238
<i>McCloskey, C. E.</i> Belladonna root.....	335
<i>McLeod, H.</i> Decomposition of potassic chlorate in presence of manganic peroxide.....	250
Meconarceine, hypnotic action of.....	104
mixtures sold as.....	176
Medal, Hanbury, award of.....	492
<i>Meissner, F. N.</i> Gallic acid.....	9
<i>Melvin, G.</i> Note on glycerinum acidi gallici.....	182
Mercurammonium chlorides, preparation, composition and properties.....	519
Mercuric benzoate, preparation.....	353
chloride, solubility in sodium chloride.....	78
iodide, antiseptic properties of.....	316
oleate, preparation.....	168, 204, 598, 634
phenolate, preparation of a definite compound.....	135
salicylate, process by precipitation.....	249
Mercurous chloride, effect of sodium chloride.....	123
Mercury, inhalation from flannels.....	611
iodides, preparation (Eads).....	123
Methacetin, distinctive tests for.....	506
preparation and properties.....	291
Methyl alcohol, presence of acetone in.....	76
Methylaniline, action of sodium hypobromite upon.....	19
Methyl chloride, apparatus for preparing.....	580
Methysticin, preparation and properties.....	8
<i>Meyer, C. C.</i> Amber guaiac.....	286
<i>Meyer, J. and E. Fischer.</i> Oxidation of milk sugar.....	425
Microscope, preparation of drug sections for.....	42
Milk, acid fermentation of	479
assays (Lynch).....	10
cow's, dilution for infant feeding.....	424
estimation of proteids in.....	363
nature of (not an emulsion).....	81
salts of, relation to behavior of casein.....	476
Milksugar, diuretic properties of.....	417
detection of glucose in.....	249
oxidation of.....	425
<i>Millard, E. J.</i> Molybdate test for hypophosphites.....	129
Mistura glycyrrhizæ comp., modified formula (Buckingham).....	75, 106
Mixture of exalgin, formula for.....	417
picric acid, use in erysipelas, etc.....	473
<i>Mohilansky, A. M.</i> Dietetics of alcohol.....	622
<i>Moerk, F. X.</i> Bismuth oxyiodide.....	236
Gleanings from German Journals.....	20, 76, 130, 176, 245, 290, 353, 411, 470, 505, 561, 608
Gold chloride and silver nitrate as tests for fixed oils.....	65
Hypophosphorous acid and hypophosphites.....	326, 386, 459
Olive oil.....	225
Molybdate test for hypophosphites.....	129
Montreal College of Pharmacy.....	636
<i>Morison, J. L. D.</i> Sodium chloride and mercurous chloride.....	123
Morphine, alteration in aqueous solution.....	244
antidote to (picrotoxin).....	176
in <i>Eschscholtzia</i> (Bardet).....	18
reaction with fluoniobate.....	19
acetate, commercial, quality of.....	336

Morphine hypophosphite, preparation of.....	530
oleate, extemporaneous preparation.....	442
sulphate, commercial, water of crystallization.....	336
Morrhual, preparation of.....	442
Mortars, cleaning of.....	236, 261
Murphy, F. E. Diospyros virginiana.....	69
Musk, commerce of.....	376
Mustard, preparations for internal use.....	124, 126
Mutton fat, iodine number.....	197
Myers, Carosso O. Scutellaria lateriflora.....	554
Mylius, F., and F. Foerster. Solubility of glass in water.....	518
Myoporum platycarpum, resin of, properties and composition.....	623
Myrrh, variety from Balsamodendron Berryi.....	508
Myrtol, commercial, is a mixture.....	247
internal use of.....	105
Naphthol (beta), formulas for dressings.....	289
for internal use.....	289
solutions, preparation of.....	416
Naphthyl ethers, action of acetyl and benzoyl chloride on.....	499
Narceine, commercial, impurities present in.....	294, 533
reaction with chlorine.....	19
meconate, composition and properties.....	176
Narcotine, derivatives from.....	549
reaction with chlorine.....	19
National College of Pharmacy.....	317
Nepeta Cataria, analysis of (Gillispie).....	555
Nereine, physiological action of.....	174
New York College of Pharmacy.....	263, 317
Nicandra physaloides naturalized in the South.....	554
Nickel, elementary nature of (Fleitmann).....	430
new metal in, and redetermination of atomic weight.....	132
Nicotine, constitution of.....	547
tartrate, acid, preparation and properties.....	292
Nitrates, orcinol as test for.....	92
phenol as test for.....	91
test for (resorcin).....	507
Nitrites, orcinol and phenol tests for.....	91
test for (apomorphine).....	470
Nitrobenzol, fluorescence destroyed by.....	132
detection in oil of bitter almonds.....	77
Nitrogen monoxide, preparation of pure.....	132
Nitronaphthalin, fluorescence destroyed by.....	132
Nitroprussiates, action of sodium hypboromite upon.....	19
Obituary —Alexander, E. V.....	160
Buck, George.....	591
Chevreul, M. E.....	272
Davis, B. B.....	160
De la Rue, W.....	319
Duflos, A. F.....	592
Engler, J. G.....	160
Galbreath, T. M.....	160
Garrigues, Edward B.....	639
Garrigues, S. S.....	319
Geuther, Anton.....	543
Gross, S. W.....	272
Hesson, R. L.....	160
Hughes, C. C.....	160
Jacobson, Oscar.....	544
Martin, W. J.....	224
Littmann, R.....	640
Menninger, H. J.....	544
Rebner, C. M.....	544
Rinedoller, C. W.....	640
Rother, R.....	639
Schlickum, O.....	319
Tilge, F. A.....	640
Vogel, Aug.....	544
Weightman, W., Jr.....	224
Wiley, Jos.....	640
Wilgus, J. F.....	319
Williams, J.....	224
Wingert, J. V.....	160
Oerter, A. E. Liquor ferri chloridi.....	122
Ogle, J. Composition of tragacanth.....	427

Oil, almond, expressed, improvement of color by blanching.....	370
yield of sativic acid.....	471
properties and reactions (Beringer).....	230, 261
angelica, comparison of Japanese and German.....	311
anise, annual production.....	311
congealing point.....	255
arachis, fluid fatty acids of	471
artemisia glacialis, yield and properties.....	374
bear root, source and properties of.....	374
bergamot, adulterants of.....	515
color of.....	312
betel, composition	312
birch, comparison with wintergreen oil.....	398
cajuput, adulteration with camphor oil.....	313
calamus, difference between Japanese and European	313
camphor, analysis.....	273, 315
character and composition.....	313
composition of an old sample	333
cananga, uses of.....	314
cantharides, from cantharidin	291
carlina root, properties of	374
castor, detection of rosin oil in.....	611
iodine number.....	197
chamomile, prevention of change of color.....	314
cinnamon, pure and adulterated, properties of.....	370, 575, 609
citronelle, export from Ceylon.....	370
cocoanut, iodine number.....	197
codliver, administration of (with lime water, etc).....	517
alcoholic extract of, morrhuol.....	442
combination with creasote.....	428
constituents of.....	560
determination of iodine in.....	248
morrhuic acid present in.....	137
cottonseed, iodine number.....	197
in olive oil, test for.....	23
presence in lard.....	195
elemi, constituents, etc.....	412
eucalyptus, odor, source, production, etc.....	371
geranium, adulteration of.....	371
hinoki, source, characteristics, etc.....	374
hop, distillation.....	372
iris, distillation.....	372
kesso-root, source of.....	372
kuro-moji, source, characteristics, etc	374
laurel-berries, constituents of.....	412
leaves, constituents of.....	412
nut (calophyllum) use and properties.....	87
lemon, adulteration of.....	515
lindera sericea, properties.....	375
linseed, iodine number.....	197
lycopodium, composition of.....	414
mace, specific gravity, characteristics, etc.....	412
maize, uses in pharmacy.....	442
yield and properties of.....	503
mercurial (gray), benzoated, preparation of.....	16
meum athamanticum, yield and properties.....	374
mineral, presence in fixed oils, test.....	413
mountain wormwood, properties and yield of.....	374
muscatel sage, source and yield.....	374
myrcia, constituents of.....	413
formulas for "bay rum ".....	312

Oil, myrtle, composition of.....	246
neatsfoot, iodine number	197
olibanum, constituents and characteristics.....	412
olive, comparison of American with foreign.....	225, 261
detection of cotton-seed oil in (auric chloride).....	23, 65
iodine number.....	197, 226
onion, distillation of	374
palm, iodine number.....	197
peppermint, relation of production to demand.....	372
petitgrains, commercial value of	372
rapeseed, iodine number	197
retinospora resembles savin.....	374
rose, determination of purity.....	373
sage, constituents, etc	412
salvia sclarea, properties and yield.....	374
sassafras, poisoning with.....	116
sesame, yield of sativic acid	471
star-anise, congealing point of,	256
yield, varieties, etc.....	474
sunflower, composition of	471
walnut, preparation, use, etc.....	419
wintergreen, artificial, composition of.....	403
comparison with birch oil.....	398
Oils of aurantiaace, manufacture from the peels.....	512
fixed, detection of mineral oil in	413
gold chloride and silver nitrate as tests for.....	65, 106, 226
non-drying, composition of	471
rancid, treated with alcohol	247
vegetable, contain linolein	507
volatile, color reactions.....	180
iodine absorption.....	301
Ointment, see Unguentum and Paste, medicated.	
for burns.	137
Ointments, preparation with tragacanth	287
Oleandrine, physiological action of.....	174
Oleate of morphine, extemporaneous preparation.....	442
Oleite, a castor-oil soap.....	443
Oleoresina aspidii, activity of precipitate in.....	169
Opium, Egyptian, of the Cairo bazaars.....	187
Orcinol as test for chlorates, nitrates and nitrites.....	91
Orthomethylacetanilide, see Exalgin.	
Ouabain, preparation and properties.....	84, 469
Oudemans, A. C., Jr. Cupreine.....	573
Owings, O. Y. Sodium carbonate and bicarbonate.....	336
Oxydendrum arboreum, free from andromedotoxin.....	361
Oxygen, preparation from permanganate.....	79
of pure, from hydrogen peroxide	565
Oxytropis Lamberti, a loco weed.....	409
Papain compared with pepsin.....	527
Papayotin, use in fissure of the tongue.....	16
Paper, litmus, blue, preparation of sensitivee.....	245
test, for electrode.....	131
Paraffin, estimation in petroleum and lubricating oils	22
liquid, a colorless variety, glycolin	316
solubility and estimation	152
Paste, medicated, for skin diseases (Unna).....	17
Pawlewski, B., and J. Filemonowicz. Solubility and estimation of paraffin... 152	
Pelargonium zonale, coloring matter of flowers	443
Pepper, black, a novel adulterant (iron ore).....	470
Pepsin in normal and pathological urine....	365

Pepsin, tests, relative value of.....	440, 527
Peptones, commercial, examination of.....	525
Perier, L. Solubility of sugar in water.....	567
Petrolatum, process for emulsionizing.....	559
Petroleum, fluorescence destroyed.....	132
Peucedanum eurycarpum, constituents of.....	557
species used by the Indians.....	556
Pflüger, E. Synthetical processes in the animal organism.....	197
Pharmaceutical Congress, seventh international.....	493
Pharmacists and medical profession, joint committee.....	492
educational qualifications.....	444
theoretical and practical training.....	445
Pharmacopœia convention, delegates to.....	540
for revision, call for.....	258, 263
nomenclature, suggestions for (Oldberg).....	439
revision, recommendations for.....	437, 440
Pharmacopœias, publication of new.....	587
Pharmacy Board, Pennsylvania.....	492, 588
law, Pennsylvania, supplement to.....	381
Phenacetin, detection of acetanilid.....	134
of antifebrin in.....	77
distinctive tests for.....	506
reaction with chlorine.....	18
with nitric acid.....	442
value in whooping cough.....	369
Phenetol, action of acetyl and benzoyl chlorides on.....	499
Phenol, as tests for nitrates, nitrites and chlorates.....	90
see also Acid carbolic.	
Phenols, camphorated, preparation.....	136
color reactions of.....	565
Phenol ethers, action of acid chlorides on.....	497
varnish for surgical dressings.....	559
Philadelphia College of Pharmacy:	
Alumni Association.....	159, 217
Class of 1888-1889.....	55
Commencement.....	216
Examinations.....	205
Exhibition of progress.....	218
Extension of course.....	262
Graduates.....	212
Honorary members.....	262
Minutes of meeting.....	201
Pharmaceutical meetings.....	19, 105, 158, 204, 260, 315, 586, 634
Phlobaphen, properties of.....	310
Photography, history and process (Butterfield).....	45, 99, 155, 199
Photomicrography, simple apparatus for.....	439
Picrotoxin, antidote for morphine.....	176, 240
presence of, in beer.....	443
Pill excipient, preparation of (Witherow).....	466
Pills, creasote (Bouchard).....	559
ichthyol, balsam of tolu coating.....	76
keratinized, insoluble in gastric juice.....	421
potassium permanganate, excipient for (Macon).....	467
purgative, Prof. Ball's formula.....	175
salol, preparation with wax.....	411
tar and iodoform, formula (Negel).....	473
thymol, preparation with soap.....	71
Pilulæ odontalgicæ, formula (cocaine).....	22
Pines of California.....	271, 443
Pinus palustris for obtaining turpentine.....	816
silvestris, composition of resin from.....	132, 362

Piper methysticum, methysticin from.....	8
preparation of kavaine from.....	136
Plants, poisonous, symptoms produced by.....	408
some Indian food (Trimble).....	4, 556
Plasters, aluminium oleate and cautchouc as bases for.....	416
see also Paste, medicated.	
Plugge, P. C. and H. G. de Zaayer. Andromedotoxin.....	360
Podophyllotoxin, preparation of, from podophyllin.....	177
Poisonous plants of California.....	443
Pollens, new medium for mounting.....	171
Polygala alba, origin of false senega.....	451
Boykinii, distribution of.....	450
Pomade for chapped hands.....	521
Populus tremuloides, resin from flower buds.....	240
Potassio-cinchonine iodide, reagent for heavy metals.....	82
Potassium bitartrate, adulteration of.....	337
bromate, preparation of.....	119
chlorate, a dangerous prescription.....	174
decomposition of, in presence of manganic peroxide.....	250
incompatible with iodide of iron.....	79
identification of, in legal cases.....	354
fluonibate in sulphuric acid, reaction of alkaloids.....	19
hypophosphite, determination of purity (Moerk).....	391
iodide, and syrup of tolu, cause of yellow tint.....	137
sulphocyanate, purification from iron.....	177
tartrate, commercial, quality of.....	335
sodium sulphites, preparation and properties of.....	584
thiosulphates, preparation and properties of.....	585
Potion, Rivière's, quick method of production.....	472
Poulet, Dr. On the acids of gastric and intestinal juices.....	25
Powder, sick-headache, composition.....	142
Powders, division of.....	385, 442, 465, 635
Processes, synthetical, in animal organism.....	197
Prochaska, O. Analysis of catarrh cure.....	10
Proteids, estimation of, with special reference to milk.....	363
Psoralea bituminosa, medical properties of.....	349
castorea, farinaceous root of.....	346
corylifolia, medical properties of.....	352
esculenta, description, use and analysis of root.....	346
glandulosa, history of.....	349
melilotoides, description and use of root.....	350
mephitica, farinaceous root of.....	346
pentaphylla, history of.....	351
physodes, medical properties of.....	350
Pyridine, action of sodium hypobromite.....	19
Pyrodine, cautious use of.....	472
compared with acetphenyl-hydrazid.....	131
proper doses.....	136
Pyrogallol liquefied with camphor.....	136
plasters containing.....	416
Quakenbush, F. B. Asclepius Cornuti and A. tuberosa.....	113
Quillaia bark not insecticide.....	177
quillajic acid from.....	142
Quinidine bromate, preparation and properties.....	121
Quinine, constitution of.....	549
recent processes for testing (chromate, bisulphate, etc.).....	146
bromate, preparation and properties.....	119
salts, solubility increased by antipyrine.....	291
Quinoleine, action of sodium hypobromite.....	19
Ratafia of cacao, formula for.....	80

<i>Rawlins, W. F.</i> Leaves of <i>Magnolia glauca</i>	6
<i>Rawson, L. G.</i> Some new tests for tannic and gallic acids.....	181
<i>Reider, E. S.</i> Medicinal catechu.....	165
Remedies, new, maximal doses.....	488
Residues, estimation of, from very dilute solutions.....	532
Resin, pine, crystalline acid from.....	362
Resina guaiaci, amber colored.....	286, 316
podophylli, assay of.....	177
Resins, chemical examination (Dieterich).....	357
Resorcin, color reactions of (amyl nitrite).....	566
liquefied with camphor.....	136
test for nitrates.....	507
to distinguish from carbolic or salicylic acid.....	468
ethers, action of acetyl chloride on.....	499
REVIEWS— <i>Adrian.</i> Etude historique sur les extraits pharmaceutiques.....	494
<i>Attfield, J.</i> Chemistry, general, medical and pharmaceutical.....	590
<i>Atti della terza riunione d'igienisti Italiani</i>	266
<i>Aulde, John.</i> Writing machines for doctors.....	53
<i>Austen, P. T.</i> Chemical lecture notes.....	111
<i>Bastin, E. T.</i> College botany.....	267
<i>Beckurts, H.</i> and <i>B. Hirsch.</i> Handbuch der praktischen Pharmacie,.....	110, 494
<i>Belzung, E. F.</i> La chlorophylle et ses fonctions.....	589
sur l'ergot du seigle.....	589
<i>Binet, A.</i> Psychic life of micro-organisms.....	267
<i>Bouvier, E. L.</i> Le système nerveux des crustacés décapodes.....	589
<i>Bowen, Cuthbert.</i> Hand-book of materia medica, pharmacy and therapeutics.....	265
<i>Catching, B. H.</i> Is the average dentist of to-day a specialist in medicine.....	54
<i>Cathell, D. W.</i> Book on the physician himself.....	541
Compendium of the laws relating to public health and safety.....	53
<i>Denison, Chas.</i> The preferable climate for phthisis.....	53
Digest of the more important publications on sulfonal-Bayer.....	54
<i>Dimock W., C. J. H.</i> Ward and <i>D. Hooper.</i> Pharmacographia Indica.....	540
<i>Dohme, A. R. L.</i> Orthosulphobenzoic acid.....	496
<i>Dulles, C. W.</i> Report on hydrophobia.....	266
<i>Farquharson, R.</i> Guide to therapeutics and materia medica.....	383
Fitting glasses.....	112
<i>Galinier, H.</i> Sur la lanoline.....	588
<i>Grinal, E.</i> La détermination de l'astigmatisme.....	543
<i>Heimann, J.</i> Der Kohlensäure Gehalt der Luft in Dorpat.....	271
<i>Hilger, A.</i> Mittheilungen aus dem pharmaceutischen Institute, Erlangen.....	494
<i>Hirsch, B.</i> Universal-Pharmakopöe.....	108, 542
and <i>H. Beckurts.</i> Handbuch der praktischen Pharmacie.....	110, 494
<i>Jadin, F.</i> Les organes sécréteurs des végétaux et la matière médicale.....	688
<i>James, B. W.</i> American resorts.....	270
<i>Jorban, N.</i> Vergleichende Untersuchungen zum Nachweis von Arsen.....	384
<i>Klein, A.</i> Nachweis von Blut.....	271
<i>Kordes, R.</i> Vergleichung der wichtigsten narkotischen Extrakte.....	52
<i>Lichinger, F.</i> Officinelle Croton- und Diosmeen Rinden.....	384
<i>Lindley, W.</i> Below sea-level.....	53
<i>Lochman, C. L.</i> Dose and price labels.....	112
<i>Maisch, H. C. C.</i> Einwirkung von Säurechloriden auf Phenoläther.....	496
<i>Marty, A. P.</i> La pharmacie à Montpellier.....	543
<i>Massey, G. B.</i> Electricity in the diseases of women.....	266, 542
<i>McNutt, W. F.</i> Mineral and thermal springs of California.....	53
<i>Merck's index</i> for chemicals and drugs.....	268
<i>Merriam, C. H.</i> The English sparrow.....	590
Methods of analysis of cattle food, dairy products, etc.....	52
<i>Mixer, W. G.</i> Elementary textbook of chemistry.....	269

REVIEWS—Newman, R. Defence of electrolysis in urethral strictures.....	267
Failure of Dr. Thomas' treatment of urethral strictures by electrolysis.....	53
Nevinny J. Wandtafeln zur Mikroskopie.....	638
O'Brine, D. Laboratory guide in chemical analysis.....	268
Pacht, Th. Verhalten der Fette zu Zuckersolutionen.....	271
Peters, H. Pictorial history of ancient pharmacy.....	110
Pharmacographia Indica.....	540
Pharmacopœia, U. S., digest of criticisms.....	266
Phenacetine-Bayer, resume of publications on.....	54
Physician's Visiting List.....	52
Planchon, L. Les produits de la famille des sapotées.....	542
Proceedings of American Pharmaceutical Association.....	111
Italian hygienists.....	266
National Confectioners' Association.....	639
National Wholesale Druggists' Association.....	112
Record of experiments in manufacture of sugar from sorghum.....	270, 639
Remington, J. P. Practice of Pharmacy.....	637
Report (6th annual) of Agriculture experiment station (Mass.).....	270
(25th annual) of the Alumni Association, Philadelphia College of Pharmacy.....	540
(2d biennial) of California State Board of Forestry.....	271
(30th annual) of inspector of milk and vinegar.....	266
(2d biennial) of North Carolina Board of Health.....	384
of Pennsylvania State College.....	53, 271
(2d annual) of State Board of Health.....	54
(3d annual) State Board of Health.....	112
Sadtler, S. P. Debt of medical and sanitary science to synthetic chemistry.....	267
Schaer, E. Verbreitung chemischer Verbindungen in der Pflanzenwelt.....	543
Smith, C. L. History of education in North Carolina.....	272
Spencer, G. L. Manufacture of sugar by diffusion.....	590
Symonds, B. Manual of chemistry.....	496
The art of dispensing.....	109
Transactions of American Association of Obstetricians and Gynecologists.....	54
Dermatological Association.....	266
Treitenfeld, B. A. Beiträge zur Toxikologie der Ortho- und Para-Toluidin.....	53
Tschirch, A. Angewandte Pflanzenanatomie.....	107
Tucker, W. G. Report to New York Board of Health.....	589
Vasey, Geo. Report of the botanist for 1888.....	591
Von Frey, E. Kohlensäure-Gehalt der Luft in und bei Dorpat.....	384
Wade, D. W. C. A new antiseptic.....	53
Displacement of the uterus.....	53
Warner's therapeutic and reference book.....	270
Wilbuschewicz, E. Untersuchungen der Amerikanischen und Javanischen Chinarinden.....	496
Wiley, H. W. Food and food adulterations.....	590, 638
Witherstone, C. S. International pocket medical formulary.....	269
Year-book of pharmacy.....	111
Zusammenstellung der Arbeiten über das Antipyrin.....	54
Rewards for discoveries and inventions.....	51
Reychler, A. Artificial diastase.....	432
Rhammus caroliniana, use of.....	554
Frangula in odontalgia.....	16
Purshiana, admission into the pharmacopœia.....	553
extracts and tasteless extracts.....	184
Rhododendron species containing andromedotoxin.....	360
Rhubarb, assay of (Drescher).....	339
Rhus aromatica, in incontinence of urine.....	189

<i>Richardson, Clifford.</i> Analysis of root of <i>Psoralea esculenta</i>	347
<i>Ricinus</i> seed, poisonous principle of.....	610
<i>Rogers, F. A.</i> Preparation of drug sections for microscopical examination..	42
Rubber as basis for plasters.....	416
tubing, hardening and disinfecting of.....	22
vulcanized, action of glycerin.....	287
<i>Rubus villosus</i> , analysis of root bark (<i>Krauss</i>).....	605
<i>Rumex hymenosepalum</i> , canaigre, use for tanning.....	395
Rust stains, removal of.....	76
Saccharin , commercial, constituents of.....	496
reaction with potassa.....	613
<i>Sadtler, S. P.</i> Recent improvements in methods of manufacture of chloroform.....	321
Synthesis of alkaloids.....	545
Saffron, adulterations of.....	261, 607
Saliva, chemistry of.....	569
<i>Salmon, E. F.</i> <i>Senna</i> pods.....	581
Salol liquefied with camphor.....	136
use in dysentery and diarrhoea.....	410
Sandalwood of Australia, <i>Myoporum</i>	623
<i>Sassafras Goesianum</i> , bark, description of.....	38
<i>Schlagdenhauffen, Fr. and E. Heckel.</i> The root of <i>Vernonia nigriflora</i>	40
<i>Schrenk, Jos.</i> Insect flowers.....	295
<i>Schroeter, H. J. M.</i> An old sample of camphor oil.....	333
Examination of chlorinated lime.....	13
On the composition of hydrangin.....	117
and <i>H. Trimble.</i> Crystalline compounds in <i>Fabiana imbricata</i>	407
Oil of camphor.....	273
Oils of wintergreen and birch.....	398
<i>Schwacke, C. A.</i> Household ammonia.....	335
<i>Schwicker, H.</i> Sulphites and thiosulphates.....	584
<i>Scutellaria lateriflora</i> , constituents of.....	555, 587
Sealing wax, indifferent to alcohol.....	178
<i>Sebelien, J.</i> Estimation of proteids, with special reference to milk.....	363
Secret remedies, prohibition of sale of.....	588
<i>Senega</i> , false, in the market.....	105
root, false, origin of.....	381, 439
test for identification and age (<i>Reuter</i>).....	413
<i>Senna</i> , market supply of.....	189
Pods, medical properties and constituents of.....	581
<i>Serem lactic sinapinum</i> , formula.....	126
<i>Sesamum</i> , cultivation in China.....	143
<i>Shkateloff, V.</i> Composition of resin from <i>Pinus silvestris</i>	132, 367
Silver nitrate as tests for fixed oils (<i>Moerk</i>).....	65
thiosulphates, double salts.....	586
<i>Sjöqvist, J.</i> Estimation of hydrochloric acid in contents of stomach.....	251
Skin diseases, <i>Unna's</i> topical applications.....	17
preparations for the.....	443
<i>Smith, A. P.</i> Estimation of diastase in malt extract.....	482
<i>Smith, Geo.</i> Dilution of cow's milk in infant feeding.....	424
Soap, native Wyoming, a silicious mineral.....	613
petroleum, formula and preparation.....	287
Soap-root used in Egypt.....	188
<i>Solanum carolinense</i> , medical properties of.....	552
<i>Söldner, F.</i> Salts of milk and their relation to casein.....	476
Solutions, dilute, estimation of solid residues from.....	532
pharmacopoeial one per cent., Br. P.....	535
Somnal. preparation and properties of.....	564
Sodium benzoate and caffeine in fruit syrups incompatible.....	288
bicarbonate, commercial, quality of.....	336
detection of thiosulphate in.....	608

Sodium bicarbonate, process of English manufacture.....	248
borate and cocaine, incompatibility of.....	18
boroglyceride, preparation.....	130
carbonate, commercial, quality of.....	336
estimation of, in presence of hydrate.....	353
chloride, effect upon mercurous chloride.....	123
dithio-salicylate, dose and effect.....	411
medical properties of.....	560
hydrate, containing nitrate.....	78
hypobromite, action upon certain aromatic derivatives.....	19
hypophosphite, determination of purity (Mørk).....	392
nitrite, manufacture of.....	618
potassium sulphites, preparation and properties of.....	584
thiosulphates, preparation and properties of.....	585
salicylate for sick headache.....	142
impurity in (salicylic acid).....	536
incompatibility with dry antipyrine.....	288
solution, stability of.....	250
sulphide, manufacture of.....	617
thiosulphate, action of acids on.....	524, 583
detection of, in bicarbonate.....	608
Sozoiolod, preparations of, strength and uses.....	17
<i>Spear, O.</i> Analysis of toilet powder.....	11
Specimens, anatomical, preservation of colored.....	245
<i>Spica, P.</i> Diosmin.....	86
<i>Spiritus sinapis</i> , Phar. Germ.....	127
Sponges, antiseptic, preparation.....	21, 473
<i>Stadelmann, E.</i> Pepsin in normal and pathological urine.....	365
Stains, ink and rust, solution for removal.....	76
Starch, determination of, by barium hydrate.....	355
iodide, as a disinfectant.....	423
Starches, new medium for mounting.....	171
State Pharmaceutical Associations:	
Alabama.....	376
Arkansas.....	377
Connecticut.....	222, 377
Delaware.....	377
Florida.....	317
Georgia.....	537, 591
Illinois.....	50, 537
Indiana.....	537
Indiana.....	537
Iowa.....	537, 638
Kansas.....	377, 539
Kentucky.....	377, 539
Louisiana.....	317
Massachusetts.....	50, 537
Michigan.....	263
Minnesota.....	50, 538, 591
Missouri.....	50, 538
Nebraska.....	378, 591
New Hampshire.....	263
New Jersey.....	318, 591, 638
New York.....	223, 538, 638
North Carolina.....	263, 538
North Dakota.....	538
Ohio.....	378, 539, 591
Pennsylvania.....	223, 378
South Dakota.....	50, 539
Tennessee.....	318
Texas.....	380, 638
Virginia.....	539
Wisconsin.....	50, 539
<i>Stefan, J.</i> Diffusion of acids and bases into one another.....	615
<i>Stengelin, W.</i> Unguentum aquæ rosæ.....	128
<i>Sticker, G.</i> Chemistry of saliva.....	569
Stigmata maydis, determination of sugar.....	70
St. Louis College of Pharmacy.....	222, 317, 376
Strophantin, properties and preparation.....	85
toxic power of.....	18
Strophanthus, chemistry of (Frazer).....	532
diuretic principle.....	137
seeds of different species.....	532
glaber, active principle of.....	469
Strychnine, character compared with exalgin.....	417
in vermin killers.....	532
quantitative separation from brucine.....	180

Strychnine hypophosphite, properties of.....	530
Styrax bark, use in Egypt.....	188
Sugar, solubility in water.....	563
Sugartree of Australia, <i>Myoporum</i>	623
Sulfonal, preparation.....	178
doses of.....	243
test for (reduced iron).....	563
Suppositories, glycerin, formulæ.....	79
use of lanolin in.....	80
Syrup, Easton's, proper amount of sugar for.....	528
Syrups, acid fruit, incompatibility with caffeine and benzoate of sodium.....	238
Syrupus, acidi hydriodici, permanent, preparation of (glucose).....	14, 49
croci, various formulas for.....	96
dextrini, use in pharmacy.....	439
ferri iodidi, preparation (Zelinka).....	78
stability of.....	440
rhei aromaticus, addition of borax.....	128
rubi idæi, distinction of genuine.....	179
simplex, amount of sugar in.....	335
sinapis, formula.....	127
tolu with potassium iodide, cause of yellow tint.....	137
Tallow, iodine number.....	179
Tanghinin, production and properties.....	472
Tannin, physiology of.....	567
Tannin-red, properties of.....	310
Tar, commercial, manufacture of.....	600
properties of.....	106
refined, preparation and properties of (Lowe).....	234, 260
pyrocatechin in.....	601, 634
Tartar emetic, aqueous solution, action of alcohol on.....	31
rotation of.....	31
commercial, examination of.....	32
pharmacopœial requirements for.....	27
volumetric estimation of antimony in.....	28
Teeth-cleanser, preparation.....	411
Test paper, electrode, preparation.....	131
blue litmus, preparation of sensitive.....	245
Theine, used hypodermically.....	244
Thiocamf, a new disinfectant.....	468
Thiol, substitute for ichthyol.....	76
Thiosulphates, action of acids on.....	524, 583
double salts.....	584
Thompson, C. J. S. Note on syrupus croci.....	96
Thymol, color reaction (amyl nitrite).....	566
determination of thymene in.....	375
iodine derivative, substitute for iodoform.....	609
liquefied with camphor.....	136
reaction of, with iodine.....	179
Tin, atomic weight.....	22
Tinctura aloes, identification of.....	505
boleti laricis, precipitate of.....	443
calumbæ, identification of.....	505
cantharidis, preparation.....	241
catechu composita, percolation of powder.....	241
cinchonæ, identification of.....	505
colchici, identification of.....	505
digitalis, identification of.....	505
ferri chloridi, impurities in.....	123
use of water to replace alcohol.....	241

Tinctura gelsemii, identification of.....	505
gentianæ comp., preparation.....	467
guaiaci, identification of.....	505
iodi, cure for warts.....	487
ipecacuanhæ, identification of.....	505
jalapæ, identification of.....	506
kino, cause of gelatinization.....	633
menstruum for.....	71
preparation.....	71
time of maceration.....	241
limonis, preparation with grated peel.....	535
nucis vomicæ, examination.....	241
identification of.....	506
opii, examination.....	241
opii, quality of.....	337
camphorata, assay of.....	338
opii deodorata, modification of process.....	242
psoraleæ composita, preparation.....	351
quebracho, identification of.....	506
quillajæ, American, preparation.....	138
scillæ, prevention of precipitate.....	242
sennæ, an inefficient preparation.....	526
sinapis, preparation and uses.....	124, 158
strophanthi, preparation of (Beringer).....	454
vanillæ, powdering vanilla for.....	242
Toilet powder, invisible, composition of.....	11
Recamier, composition of.....	99
Toluidine, action of sodium hypobromite.....	19
Toothache drops, formula for.....	286
Toothpaste containing hydrogen peroxide.....	411
Toothwash, disinfectant, formula for.....	612
Tragacanth, composition of.....	427
soluble gum of.....	72, 106
Traube, M. Hydrogen peroxide from persulphuric acid.....	620
Trimble, H. Canaigre.....	395
Some Indian food plants.....	4, 556
and H. J. M. Schroeter. Crystalline compound in Fabiana imbricata.....	407
Oil of camphor.....	273
Oils of wintergreen and birch.....	398
Old sample of camphor oil.....	333
Turpentine, Russian, crystalline acid from.....	132, 362
Ulm, properties of.....	310
Umney, J. C. Congealing point of anise oil.....	255
Unguentum aquæ rosæ, formula (Stengelin).....	128
hydrargyri, colored with Prussian blue.....	337
preparation with lanolin.....	247
process of assay (Dieterich, Kremel).....	290
rapid preparation with amalgams.....	466
with glycerite of starch requires lanolin.....	287
iodi, bases for.....	128
naphtholi, strength and uses of.....	16
picis, use of wax for.....	106, 634
potassii iodidi, inalterable (glycerin).....	79
zinci with mucilage of tragacanth.....	561
Uralium, hypnotic properties.....	416, 471
Urea, simple apparatus for determining.....	439
Urine, detection of acetone in.....	175

Urine, effect of coffee.....	141
estimation of albumin (Zahor).....	24
pepsin in normal and pathological.....	365
Uva ursi, free from andromedotoxin.....	361
Valerian, odorless preparation of.....	417
Valerianic ether, medical properties and administration of.....	521
Valser and Granval. Falsification of oleic acid.....	475
Vanilla, detection of benzoic acid on.....	20
Varnish, phenolated pyroxylin, for surgical dressings.....	559
Vaubel, W. Behavior of sodium thiosulphate with acids.....	583
Veratrum alkaloids, estimation of.....	290
Vermillionette, preparation of.....	17
Vernonia nigrifolia, properties, etc. of root.....	40
Villosin from blackberry bark.....	606
Vinum ipecacuanhæ, assay of.....	529
sinapios, formula.....	126
Wagaman, S. A. Granules of morphine sulphate.....	336
Wall paper containing arsenic.....	438
Warden, C. J. H. Erythroxylon Coca grown in India.....	358
Warren, T. T. P. B. Walnut oil.....	419
Warts, removal by carbolic acid.....	85
by iodine.....	487
Water, solubility of lead in.....	531
aerated, nitrous impurity in, effects of.....	529
seltzer, local anæsthesia with.....	613
Waters, bitter, natural and artificial.....	443
Wax, bees, adulteration with paraffin, detection of.....	564
powdered, preparation and use of.....	294
yellow, adulterated with paraffin.....	337
Westphal, G. H. Native Wyoming soap.....	613
Wheat, embryo as food.....	361
Wiegand, Thos. S. On the dispensing of powders for prescriptions.....	385
Wiernik, T. and G. Lunge. Specific gravities of ammonia solutions.....	516
Wild cherry bark, preparation of, amount of hydrocyanic acid.....	534
Wilder, H. M. Cleaning of mortars and graduates.....	236
Division of powders.....	465
Williams, W. L., and Prof. Dunstan. Metameric amyl nitrites.....	148
Wilson, J. A. Cottonseed oil and beef fat in lard.....	195
Wine, raisin, formula for.....	245
Witherow, J. H. Pill excipient.....	466
Wood, H. S. Glacial acetic acid.....	335
Wool fat (see Lanolin).	
Woolley, E. J. and Prof. Dunstan. Chemical constituents of amyl nitrite.....	153
Wyoming soap, native, a silicious mineral.....	613
Yaraque, preparation from cassava.....	80
Zahor. Densimetric estimation of albumin in urine.....	24
Zinc cyanide, in affections of the heart.....	97
oleate, preparation of.....	595
oxide, plasters containing.....	416
salicylate, rapid preparation.....	180
sulphide, use of, in eczema.....	609
Zygadenus elegans, a loco weed.....	409
Nuttallii, poisonous effects of plant.....	410
venenosus, death camass of Indians.....	410
Zygophyllum coccineum, fruit, use by the Arabs.....	189
simplex, leaves, use in eye diseases.....	189



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"As a final result, then, we may consider the true proteolytic power of the following pepsins compared with the one of highest digestive power to be as follows:

	Relative Proteolytic Action.
1. Parke, Davis & Co.'s Pepsinum Purum in Lamellis.....	100
2. Fairchild's Pepsin in Scale.....	52
3. Scheffer's dry Pepsin, concentrated.....	48
4. Jensen's Crystal Pepsin.....	35
5. Ford's Pepsin in Scales.....	32
6. North's Pure Pepsin.....	16
7. Boudault's Pepsin	14
8. Royal Chem. Co.'s Pure Pepsin.....	9

"As to the actual strength of these preparations, 1 milligram of the strongest pepsin converted into soluble products 198 milligrams of the pure dry albumen, which would be practically equal to 2000 parts of fluid egg-albumen."

While the use of pepsin was for a time confined chiefly to internal administration, it has been gradually extended to the digestion of visible false membrane and abnormal tissue growths. Thus many physicians have used it with some degree of success in digesting the false membrane of diphtheria and membranous croup. The use of pepsin is likely to become much more universal and efficient with the greatly augmented digestive power now possessed by the latest improved pepsin.

To pharmacists who wish to learn more of the action and incompatibilities of pepsin, and of the interesting history of the researches that have resulted in the superior quality of pepsin now to be had, we shall be pleased to send on request reprints of articles by R. H. Chittenden, Ph. D.; John R. Winslow, M. D.; H. B. Douglass, M. D.; J. Le Roy Webber, Ph. G.; F. A. Thompson, Ph. C., and others; and a sample of Pepsinum Purum in Lamellis for trial.

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Detroit and New York.

Vol. 61

AMERICAN

No. 12

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CONTENTS.

Oleates. By G. M. Beringer, Ph. G.,	588	On Some Sodium and Manganese Compounds.	597
Commercial Tar. By R. G. Dunwoody,	594	Formation of Hydrogen Peroxide from Par- asulfuric Acid. By M. Traube,	598
Contribution to the Knowledge of Boron. By Henry C. U. Malsch, Ph. G., Ph. D.,	602	The Resin of Myoporum Platycarpum. By J. H. Maiden, F. L. S.,	603
Analysis of Blackberry Bark. By Gustav Adolf Kraus, Ph. G.,	605	The Toxic Action of the Albumen from the Seeds of Abrus Precatorius. By D. Sidney Martin,	605
Note on Adulterated Spanish Saffron. By G. M. Beringer, Ph. G.,	607	Eucalyptus Oil and Eucalyptus Kino. By J. H. Maiden, F. L. S., F. C. S., etc.,	609
Gleanings from the German Journals. By Frank X. Moerk, Ph. G.,	608	Minutes of the Pharmaceutical Meeting. Editorial Department,	634 636
Abstracts from French Journals. Translated for the A. M. JOUR. PHARM.,	611	Reviews and Bibliographical Notices,	637
Native Wyoming Soap. By Hermann West- phal, Ph. G.,	613	Obituary,	639
Diffusion of Acids and Bases into One Another. By J. Steiner,	615		

NOTICE TO READERS.

The JOURNAL is devoted to the advancement of PHARMACEUTICAL KNOWLEDGE and to the advancement of a MORE THOROUGH EDUCATION and PRACTICAL TRAINING for all persons engaged in PREPARING and DISPENSING medicinal drugs and chemicals.

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STATE PHARMACEUTICAL EXAMINING BOARD.

The next examination will be held at Philadelphia in the second week of January, 1890. Applicants for examination should apply to the secretary of the board, H. B. Cochran, Lancaster, Pa., about the middle of December, for the necessary blank form of application, and the exact time and place of the meeting.

THE third of the present series of Pharmaceutical Meetings will be held at the College of Pharmacy, Tuesday, 17th inst., at 3.30 P. M. All interested in the progress of Pharmacy are invited to be present and to take part in the proceedings. T. S. WIEGAND, Registrar.

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